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JOURNAL

OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH

An Official Quarterly Record of
Information for the Public

MARCH, 1897

Proceedings of the January Quarterly Meeting

Subjects: The Protection of Public Milk Supplies from Pollution — Danger from Lingering Diphtheria Bacilli in Convalescents from Diphtheria

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JOURNAL OF THE

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

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JANUARY QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The January quarterly (or regular annual) meeting of the Massachusetts Association of Boards of Health was held in Boston at the Parker House on the afternoon of Thursday, January 28, the President of the Association in the chair. Following is a report of the proceedings: —

THE PRESIDENT.— Will the Association come to order. The Secretary will read the records of the last meeting of the Association.

The records of the last meeting were then read and approved.

THE PRESIDENT.— The next business in order is the election of your officers for the ensuing year. What action will you take thereon?

SECRETARY FARNHAM.— I move that a committee of three be appointed by the Chair, Mr. President, to bring in a ticket.

The motion of Dr. Farnham was then put and unanimously carried. The President appointed the following members as such committee: Dr. Gage, of Lowell; Mr. Pilsbury, of Boston; Mr. Newcomb, of Salem.

THE PRESIDENT.— During the absence of this committee, I will ask the Treasurer to read his report for the year.

The report of the Treasurer was then read, as follows: —

TREASURER'S REPORT FOR 1896.

RECEIPTS.

Balance from 1895	$546.14
Annual assessments	236.00
	$782.14

EXPENDITURES.

Stenographic report of meetings	$123.25
Postage	10.67
Printing	15.40
Stationery and clerical assistance	10.83
Dinners for invited guests, cigars, etc.	16.80
Total expenditures	$176.95
Balance to 1897	605.19
	$782.14

Respectfully submitted,

JAMES B. FIELD, *Treasurer.*

Examined and approved as correctly cast and properly vouched.

WILLIAM P. BOWERS, *Auditor.*

THE PRESIDENT.— If there is no objection, the report of your Treasurer will be received and placed on file.

The Executive Committee desires to report to the Association the following-named persons as candidates for membership in this body: —

EDWIN E. WAITE, M.D.	New Bedford.
JAMES W. HOLLAND, M.D.	Westfield.
JOHN CRAWFORD	Cambridge.
EVERETT O. CLARK	Weston.

William F. Curtin	Lowell.
Charles L. Fox, M.D.	Lowell.
C. T. Symmes	Lancaster.
H. M. Nash, M.D.	Lancaster.
F. A. Willard	Lancaster.
Charles H. Phippen	Salem.
G. F. Simpson	North Adams.
A. W. Buck, M.D.	Fall River.
David D. Brough, M.D.	Boston.

Is it your pleasure that these named persons be elected members of this Association? If so, you will please signify it by saying aye.

The vote was then taken, and the above-named persons were unanimously elected members of the Association.

The President,— Is there any incidental business that can properly come before the Association at this time while we are waiting for the report of the committee on officers for the ensuing year?

Dr. Durgin.— I should like, Mr. President, to give notice that I will bring in a resolution at the next meeting for the reduction of the annual dues from $2.00 to $1.50.

The President.— Under our by-laws Dr. Durgin gives notice that at the next meeting he is to introduce a motion to reduce the annual assessment to $1.50, and action can then be taken upon this proposition.

In order that we may get at the work of this afternoon, Professor Sedgwick has kindly consented to read his paper now; and, when the committee come in with their report, we can make the necessary interruption.

ON THE PROTECTION OF PUBLIC MILK SUPPLIES FROM POLLUTION.

BY PROFESSOR W. T. SEDGWICK,

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

The milk-supply question is to-day perhaps the most pressing problem in American sanitation. The public has become tolerably well informed in regard to the dangers of impure water. City officials, engineers, and members of boards of health, physicians, sanitarians,— almost everybody,— now know that with water, as with many other things in this world, appearances are often deceitful, and that in the innocent-looking, sparkling glass of cold water, once the symbol of purity and the emblem of charity, may lurk the germs of disease, the messengers of death. In many States much still remains to be done, to be sure, in educating the people and in providing them with pure water; but in our own fair State, thanks to a wise and able State Board of Health supported by an enlightened and generous public opinion, this great work of education and provision is well advanced. And this is the more fortunate as it bids fair to enable us as sanitarians and guardians of the public health to begin to turn our attention to another aspect of preventive medicine, which urgently demands our most serious attention.

Next in magnitude and in importance to the question of water supply is that of milk supply. There can be no question of this. The only question is whether it stands next before or next after in urgency and importance. Like water, milk is a liquid, and hence favorable as a vehicle for micro-organisms. It is less used than water, but far better soil for bacteria to thrive upon. It is more costly than water, but still cheap and deservedly of high repute as food. It wears a heavy veil of white,— everywhere the emblem of purity and innocence; but there is only too much reason to fear that milk is often nevertheless wolfish, though arrayed in sheep's clothing. Water is, in essence, inorganic and not subject to decay: milk is a direct product of living animal tissues and, being richly

organic, is therefore highly putrescible. Water is usually served in towns and cities from tightly-closed pipes or vessels buried in the earth, so that it arrives in much the same condition as when it left its source. Milk is extensively manipulated by human agencies, transported in various vessels by wagon or by rail, and reaches the consumer in a totally different state from that in which it left its source,— the cow. The germs of most diseases die out in pure water. The germs of many diseases probably thrive in pure milk. In fine, milk, by virtue of its high reputation as a food, its veil of white, its richness in organic matters, its fluid consistency, and its cheapness, is an ideal vehicle for the distribution of disease germs, if these once find entrance into it. That disease germs do often find entrance into milk supplies is now a truism.

I have long dwelt publicly upon these facts, and from time to time, in epidemiological investigations for the State Board of Health, have had fresh and striking proof of their importance.

The great epidemic of typhoid fever in Springfield in 1892 taught Dr. Chapin and myself lessons in regard to milk and its dangers which we shall never forget. An epidemic of typhoid fever in Somerville in the same year led me to consider the part played in milk epidemiology by the *system of supply*, and similar epidemics during July, August, and September last in Cambridge, compelled me to return to the question. I had long suspected that the system of supply, or the handling, of the milk in Boston and vicinity was peculiar, and in some ways very objectionable from a sanitary point of view; and I was curious to know how it compared with the systems in vogue in other American cities and towns. On behalf of the State Board of Health I have, accordingly, recently visited the principal cities as far south as Washington, and made inquiries in cities as far westward as Chicago, in order to be able to compare the Boston system of supply with theirs. But, before describing the systems of supply in other cities, I ought, perhaps, to say something about the system in the Greater Boston, because, I dare say, there are members of this Association who are not familiar with the details of that system. In the matter of milk supply, as well as in other problems, it is necessary to go into details if one would fully understand the situation.

THE BOSTON SYSTEM OF MILK SUPPLY.

In Boston the milk is very largely railroad milk; that is, it comes from more or less remote towns as far west as the Hoosac Tunnel, and northward and southward nearly as far, and is brought in on trains in small cans,— small, I mean, as compared with those in use in other cities. As a result of what I have seen in other cities I am led to believe that in Boston the system is more differentiated, more highly developed, more admirably managed from an economic point of view than in any other city. It is controlled, according to a recent statement of Mr. Whitaker of the Dairy Bureau, largely by three men,— this railroad milk supply; and those men are known as "contractors." The trains, carrying the milk in eight-and-a-half-quart cans, come into the city, arriving, as a rule, about ten o'clock in the morning. The cans are then taken from the train by the local dealers, whom we may call local milkmen or pedlers, if we please, or dealers. They are not milkmen in the strict sense; at least, they are not cowmen, because they do not deal with the cows at all. They are local milkmen,— local dealers we may call them for convenience. The milk is taken by them to their headquarters or houses, which contain milk-rooms. These are too often closely connected with stables in which the horses are kept. It would not be fair to say exactly that the milk is handled in the stables; but the stables are generally only a few feet away, and the association of the horses with the milk is decidedly too close to satisfy good sanitary conditions. The milk-room is provided with ice-chests and the like and, what is of the highest importance, with one great "cooler," as it is called, or "mixer," a large tank holding the contents of a number of the cans,— perhaps ten, or even more in some cases. Over the top of this mixer is stretched, for a strainer, a cloth. At the bottom is a spigot.

All the cans, as soon as possible after they are brought into the milk-house, are "tasted." This is done often at the tail of the wagon, the can being simply tipped up on the tail-board and the plug knocked out; the man in charge "tasting" the milk to see if it is fresh. This is done as a protection to the dealer; for, if a can is sour, that can will be returned to the farmer from whom it came, and

of course the milkman does not pay for it. Now I cannot say that this is the first objectionable operation in the handling. One should begin, of course, with the conditions on the farm, in the stable, and all that; but I will pass that by. The time spent on the train is another element. I ought to have said that the milk brought in at 10 A.M. is generally that morning's milk and the milk of the night before. Arriving at ten or eleven o'clock, it is tasted and handled before noon. After the men have done their morning delivery in the early hours of the day, they go to the trains and get the cans for the next day's delivery, bringing them to the milk-house and tasting them soon after their arrival, in the way that I have described. Any sanitarian, I think, must stop right here, and say that this "tasting" system is most objectionable, because, even if we do not put the worst face upon it,— and I am very anxious not to do that because this is an important industry and concerns the welfare not only of dozens of farmers, but of dozens of other men whose living depends upon their successful handling of the milk,— I say even if they do not do the worst things that are suggested and said sometimes to be done (namely, take the milk into their mouths, taste it, and then return it to the can in order to lose no milk), yet the mere tasting and spitting of the milk out upon the floor is not a cleanly operation, as I have often seen it conducted; and, if the man who does it or the boy who does it happens to be suffering with an infectious disease, an early stage of diphtheria perhaps, it is not a pleasant thought that he has brought his lips in contact with a can the milk from which may find its way to your table or to mine. The tasting operation is, perhaps, almost essential, under our system, to protect the milk dealer. But we are not now considering chiefly what is essential or advantageous. We are considering what are the facts, as a basis for proper sanitary interpretation of the conditions. And at once we must set down the tasting operation, it seems to me, as highly objectionable from every point of view. I may say I found the same custom in most of the cities I visited,— Washington, Baltimore, etc.,— but not in New York. There is every reason to believe that the custom grew up before any one realized the dangers of it. All our ideas about infectious diseases are new. The germ theory did not get established until about fifteen years ago in any reason-

able fashion; and the germs of the principal infectious diseases were not worked out until a little later than that. So that it is not strange that this custom, pertaining really to a primitive period, should have grown up as it has and remained as it has.

The milk having been thus "tasted," the cans are emptied, one after another, in Boston,—this is all about Boston thus far; and I wish to emphasize some of these points, because they are peculiar to us, different from what we find in any other city; and I wish, moreover, to draw the conclusion which I believe to be perfectly just, that the system, while admirable from an economic point of view, from the point of view of convenience and all that, is, from a sanitary point of view, perhaps more objectionable than that of any other city that I have seen,—the cans, I repeat, are emptied through the cloth strainer into the "mixer," and their contents are thus mingled, the dealer often mixing milk that has come from several different farms, different dairies. I am thinking of one man who used about eighty cans a day. He derived them from as many, I should say, as eight or ten different dairies, some of course furnishing only one or two cans, others many more than that. And, as these are handled in the car and handled in the wagon, it is as likely as not that a can from dairy A may stand next to one from dairy B, and one from dairy B may stand next to one from dairy C; and then, one after another, their contents may go together into the mixer. Now, this is highly objectionable, because, if there is disease in the milk from any one farm, you have here a diluted mixture of the whole; and when the little cans are filled from the spigot below, as will shortly be described, an even dose, though perhaps a slight dose, is drawn off into each one of them. This "mixing" of various milks is also, not entirely but largely, peculiar to Boston, and objectionable from a sanitary point of view, as any sanitarian can see.

The next step is the filling of the little cans. And Boston is the only city that I have discovered in which the milkman furnishes such little cans, furnishes the receptacle for the consumer. In New York, Philadelphia, Washington, Baltimore, Albany, New Haven, Buffalo, Cleveland, and all other large cities that I know about, the consumer, except in the "bottle" trade, furnishes the receptacle.

The milkman deals out the milk from some receptacle of his own, which he uses over and over again. But once the milk has gone from his can, or whatever it may be, on the wagon, his connection with it has ceased; and, no matter whether there is typhoid fever or Asiatic cholera in the house which he serves, there is never any ready means of communication from the house back to his wagon. But see how it is in Boston. The milkman furnishes numerous quart or pint tin cans, which he fills at the spigot attached to the cooler. These small cans are then stowed in refrigerators and iced. If bottles are used, they are filled in the same way, essentially; and I shall have to say more about that in a moment. The small cans or bottles are filled from the spigot, with the hands of the operator passing over or near the mouth of the can. And if any one of those cans has received a germ or a number of germs from any source, although the ice reduces the temperature to a point at which growth is probably slight, yet there is possibility, especially if the ice happens to run a little short, of the germs growing in the little cans. These cans are kept on the ice until the next morning, thus of course adding to the age of the milk and giving further opportunity for germ growth. And this particular mixing and handling does not occur in any other city, because they do not put the milk in little cans at all. The milk stays in big (usually ten gallon) cans, the product of each dairy separate from that of every other.

Very early the next morning the dealer loads his wagon with the little cans and some eight-quart cans for the bakery and grocery and other "wholesale" trade. And the Boston wagon, I find, is also peculiar and not seen in any other city. It is very ingenious. One horse draws a good deal more milk here than anywhere else. We have arrived at a fine differentiation of the system, admirably arranged as it is from a business point of view. And those cans are left on the doorstep at an hour of the morning suggestive of freshness, although the milk they contain is really at least twenty-four, and often thirty-six, or even more, hours old. Now if the can which is left on my doorstep to-day was yesterday in a place where there was scarlet fever or diphtheria, or stood on a kitchen table in a tenement perhaps, there is a chance that it may have got contaminated, and then having gone back to the milk-house, and perhaps

not having been thoroughly washed, it may bring to me the next morning the germs of disease. I say no other city, as far as I know, anywhere, has our peculiar system. It is very convenient for the consumer. We do not have to provide any receptacle for the milk we buy. The servant-girl does not have to look out and have a bowl ready or a quart-cup. The milkman does it all. But from a sanitary point of view this must be regarded as an objectionable feature, because this system furnishes a possible bond of connection and the transfer of disease from house to house.

To return for a moment to the spigot and the filling of the little pint and quart cans, and also to the emptying of the big cans. If one of the men in the milk-house is in an early stage of typhoid fever; and if, as generally happens, there is a privy near by to which this man retires, with a mild diarrhœa perhaps; and if, further, as too often happens, he does not thoroughly clean his fingers on returning from the privy, but proceeds to empty the big cans into the cooler or to fill the little cans from the spigot,— it is not difficult to see that we have here an opportunity for contamination. In the principal Cambridge epidemic of 1896 I had every reason to believe that it was in some such way that the infection took place. The milk-farms from which the milk came were all right, as far as any one could discover,— they were even unusually good. We believed that the milk when it arrived in the city was in good condition, and also when it arrived in the milk-house. It was the milk-house of a careful, honest, and intelligent dealer. But it so happened that he had three helpers there who were, successively, in what we believe to have been an early stage of typhoid fever, basing our opinion upon expert medical evidence. We know that these people worked over the milk; and we know that there were eighty-six cases of typhoid fever more or less clearly due to that milk. There was nothing out of the way on the farms; but there were these people in an early stage of the disease in the milk-house, and they were working over the cans in this way. We know that they retired frequently to the privy, because they admitted it. They had bowel complaint, as they called it. And the privy was conveniently near, and not of a high grade. It was very easy to imagine, though not to prove — for there was no proof, it was strong

circumstantial evidence only — that the trouble might have come in that way.

Such, then, is the Boston system: railroad milk in large quantities and, at the sources, not differing much from the milk in any other city, brought on trains which arrive at ten o'clock in the morning,— a convenient hour for the milkman, but resulting in an age of the milk which is undesirable; taken to the milk-house and mixed in an unfortunate fashion; first tasted in a very unfortunate fashion, then mixed, drawn off into little cans through a spigot, by hand. And, if any one has watched that operation and knows how the "striker" operates, he knows how he throws the little cans in under the spigot one after another, his hands very often coming into the stream of milk, the connection between fingers and milk-can being of the most intimate sort, food and fingers getting mixed up in a very unpleasant way. And, finally, we have the system of little cans furnished by the dealer, and not by the consumer. It is necessary, it seems to me, to go minutely into these details, if we would inquire further into the methods of protection. We must know where the trouble comes from before we undertake to remedy it.

SYSTEMS OF MILK SUPPLY IN WASHINGTON AND BALTIMORE.

How is it in other cities? In Washington I find that quite a lot of railroad milk arrives in much the same way; but it comes, to begin with, not in eight-quart cans, but in forty-quart cans, big and heavy. These are taken from the station directly to the dairies, as they are called there, which correspond to our milk-houses. But there is no stable near, and no mixer. The cans are set right in big tubs of ice-cold water or ice, and the milk is kept *in the same cans* in which it arrives. The trains arrive at the same time as in Boston; and the next morning these cans are put into wagons, open in the middle, such as you have all seen in New York, but with a "churn," as it is called, beside the driver, in which the milk of one or two cans is mixed. It holds a good amount of milk, two or three cans, these being forty-quart cans: two, perhaps, are dumped into it, and then the milk is drawn out and sold. When that is drawn out, more milk is put in. But in both Washington and Baltimore, such

mixing as there is is done only just before delivery; and in both cities the milkman sits in the wagon. In Baltimore he rings a bell, which is a nuisance to any one trying to sleep in the morning, the ringing of bells all through the city being enough to drive any one distracted, if he is not a good sleeper. On the ringing of the bell, a servant is supposed to come out of the house with a quart-cup, or some receptacle, and get the milk. The day that I was there it was very cold, and the milkmen I happened to see did sometimes carry the milk into the house in their measure. But they poured it into something in the house, and brought nothing out of the house except what they had carried in for the moment only.

In Washington they are doing a good deal of bottle trade. In Baltimore and Philadelphia that is also being done a good deal, and in New York. But in all these places the health authorities regard it as objectionable, because it is an approach to the Boston system of furnishing the receptacle for the milk, and thus making a bond of connection which may wind in and out from the houses of the patrons to the milk establishment. They might also object to it for another reason, which they have not yet become familiar with; namely, that in the process of filling these bottles the milk from different dairies is necessarily mixed. In Washington I saw an ingenious bottling establishment where a big reservoir runs on a track,— a big wooden tub it really is, a square tub which runs on a track. In the bottom of the reservoir is a series of holes, with plugs. The bottles are put between the wheels on the track, and this receptacle is rolled along over the bottles. As it arrives over each row, the plugs are pulled out, the milk runs in, and the plugs are then put back. In order to accomplish this rapidly, the milk has to be mixed. In New York the Board of Health has very strict rules about the bottling of milk; but, in general, I may say that it is objected to by officials more on account of the bottles, which go from house to house, than on account of the mixing.

We are plainly dealing with a system which has slowly grown up, and it is very interesting to see how it has been evolved. We start with one family having one cow. Then come one hundred families and one hundred cows and a middleman must come in: if we have a thousand families and a thousand cows, we must have

more middlemen. And when we reach a hundred thousand families and a hundred thousand cows, we have to draw from all the neighboring States. The matter has become an immense *system.* It is evidently an evolution made necessary by the development of the community from village life up to urban life.

The Baltimore system is a good deal like the Washington system. I should have said that they have two deliveries a day in Washington. The reason for this is because it is a warmer climate. In Baltimore the reform administration has established some very good laboratories; and the chemical, and even, indeed, the bacteriological, examination of milk is undertaken to some extent. And yet their laws or rules are defective; the courts do not support them very well, and the principal remedy which they seem to have is what they call "spilling." They spill the milk at the borders or frontiers of the city, at the railway stations, if they find it bad. And while that does away with the milk, it does not of course really meet the case as well as the system of inspection and penalties that we have here. There is some mixing there, and there is some bottle trade; but most of the milk is delivered from the single can just as it comes from the farm, without having been mixed with the milk from any other dairy. Dr. Stokes, the bacteriologist of the health department, an excellent pathologist, has lately reported a form of diseased milk which was new to me. I should like to touch on it for a moment, because it seems to me a remarkable and interesting case. The milk inspectors in Baltimore noticed that one of the samples of milk seemed to be very rich and creamy, but at the same time somehow did not look right. On studying into it with a centrifugal machine and a microscope, they found that it was filled with pus. I quote from the original paper by Dr. Stokes and Dr. Clement, State veterinarian: * —

Dr. Clement "was called upon professionally in August to attend a herd of cattle which, as the owners said, were 'milking pus.' I found a herd of about seventy cows all affected to a greater or less extent. They were all nearly dry, and what milk could be obtained was of a thick, yellowish nature. The cows stood in a double row of stanchions. The history obtained, after careful inquiry, was that the disease first appeared in one cow; that the owner's attention was

* *Maryland Medical Journal,* Jan. 9, 1897.

called to the condition of the milk by the retailers who bought it. The infection spread to the rest of the herd with great rapidity, so that in the course of two or three weeks the whole herd had become affected.

"These cattle were at the time on pasture, fed twice a day on mill feed, and, according to the foreman's statement, milked regularly. Further inquiry brought forth the information that a strange man had hired out on the farm, who was an experienced milker, but who sought professional advice from the physician attending the family for a sore upon his finger, which he said he got from milking cows on a large dairy farm in York, Pa. This man left the place in about a week; and a few days after his departure the disease appeared in the first cow, soon followed by its appearance in the rest of the herd. Cleanliness and irrigation with warm water gradually caused the animals to become dry, in which condition they have remained up to the present time. A complete autopsy was made upon one of the cows, but nothing abnormal was made out, with the exception of a purulent inflammation of the somewhat dilated milk ducts. Cultures from the blood of the beast and the internal viscera remained sterile."

THE SYSTEM OF MILK SUPPLY IN PHILADELPHIA.

In Philadelphia the amount of milk which is used is of course great. A very large amount of it (seven-eighths) comes on the railway. It is taken from the trains in the original forty-quart cans directly to tubs of ice-water, and kept and cooled until the next morning. The trains arrive, as here, in the morning; and there is not very much to be learned from the Philadelphia system that I have not already mentioned for other cities, excepting with regard to a few points. In the first place, they have pretty strict rules about tuberculosis, regarding which the following Resolutions with Preamble attached were adopted by the Board of Health of Philadelphia on Oct. 16, 1894: —

Whereas it has been decided by competent authority that physical examination alone is an uncertain and therefore unreliable means of determining the freedom of cattle from tuberculosis; and

Whereas the tuberculin test is the only means of detecting many occult cases of this disease, and is therefore indispensable in arriving at the knowledge that a herd of cattle is free from tuberculosis,— therefore

Resolved, that the Chief Inspector of Milk be and is hereby instructed to indorse as *untrustworthy* all certificates of the freedom of herds of milch cows from tuberculosis that are not based upon the use of the tuberculin test by trained veterinarians.

Resolved, That the Chief Inspector of Milk keep a book in which shall be

registered all herds of milch cows that supply the city of Philadelphia that have been certified as free from tuberculosis by the method approved by the Board of Health, also of such as have not been thus reliably certified, and which are therefore "suspicious," which records shall be open to the inspection of the public. Said records shall contain the names of the dealers supplied by such herds.

Resolved, That all producers of milk supplying the city of Philadelphia who fail after sixty days' notice to furnish a certificate or clean bill of health of their cattle, based on the method of examination demanded by experts and approved by the Board of Health, shall be reported to the board, and be liable to have their milk rejected as being "*suspicious*."

In this connection I may remark that in several cities grocers and small dealers in milk are obliged to keep posted in plain sight a placard stating the sources of the milk which they are selling, so that, in case an epidemic occurs, or anything of that sort, an inspector could see at a glance where that milk came from. I think that this would be a great help anywhere. One of the chief things an epidemiologist has to do in a milk epidemic is to hunt about and find out where the milk comes from, and this often takes a great deal of time and trouble.

One of the interesting things in Philadelphia is its attitude toward skimmed milk and what they call "creamery slop" or "creamery refuse." They make a special point of this. They say that skimmed milk is one thing; hand-skimmed contains 1.75 per cent. to 3 per cent. butter fat, dependent on the method of setting; while creamery refuse contains from 0.1 to 0.3 of 1 per cent. of butter fat. That is, one is 1.75 to 3, and the other is from 0.1 to 0.3 of 1 per cent. Inspector Burns is very earnest upon this subject: he has, as the phrase is, "no use" at all for the material left by the separator, the milk which we should commonly call separator-skimmed milk; and the Board of Health of Philadelphia does not allow it to come into the city at all, but designates it by such names as "milk refuse," and "separator slop." If any one is interested in it, there is a long legal discussion in the Report for 1895 in regard to these matters, with a charge from Judge Hare covering several pages, which of course I cannot go into now. I may add that in New York no skimmed, or otherwise robbed, milk — that is, no milk except whole milk — is allowed to be sold or admitted to the city *in any form*.

The New York Board of Health takes the ground that if they once admit such a thing as skimmed milk into the city, it will surely get mixed with the whole milk, even although it is printed on it that it is skimmed, in letters of Gothic, etc.: it is a great deal better, they hold, to keep it out altogether, and they take that stand very strongly and in spite of the possible food value of such milk. In Philadelphia they admit the ordinary skimmed milk, but refuse skimmed milk derived from the separator.

THE SYSTEM OF MILK SUPPLY IN NEW YORK.

New York is, on the whole, it seems to me, by far the most interesting and instructive of our neighboring cities in every respect as regards its milk supply, because, in the first place, although it draws milk from as far away as Pittsfield, Mass., and Hornellsville in the western part of the State of New York, it has a very useful set of maps and a card catalogue showing exactly the districts from which the milk supply is derived. Then they have no contractor system in New York. There are one or two rather large wholesalers, but not very large. And the milk which comes on the trains for New York and Brooklyn — for it very largely comes through New York to Brooklyn, Long Island not supplying milk enough — arrives and is delivered to the consumer from these great distances as fresh in point of time as the milk that reaches Boston from a town like Acton, a point relatively near to Boston. In other words, it is so arranged that the trains arrive in the city from 9 P.M. to 7 A.M. They do not come in, as they do with us, at 10 in the morning: they arrive in the evening and the night. And the dealers, who are in communication with the farms from which the milk comes,— they are not buying through great contractors for the most part,— go to the train, take the cans, which are forty-quart or twenty-quart cans mostly, upon the wagons which are familiar to all visitors to New York,— those wagons having an opening in the middle, the man sitting with some cans in front of him and some cans behind him. They do not take the cans to milk-houses and taste them there. They do not mix their contents at all. They do not put the milk in little cans. The consumer furnishes the recepta-

cle. So that it actually turns out that the milk delivered in New York is first, as fresh as the milk delivered in Boston; and it is delivered in the "original packages," so to speak, which is, I hold, a very important sanitary matter, because, even if there is infection in one forty-quart can, it is limited to that can, it is not mixed up with a lot of others and sent about in numerous little cans.

And the care of the milk and the rules for the registration of the dealers are remarkably good. Here, for instance, is a blank. I should say, right here, that a great deal of the milk that comes to New York comes from creameries, the creamery not being always what we understand as a creamery in the first instance, but really a milk-house in the country, a sort of clearing-house in a country town. A great deal of the milk also is condensed milk,— not what we buy as condensed milk, but more like what the New England Kitchen sells as evaporated milk. And the New York Board of Health obliges each owner of a creamery or condensary to fill out a blank such as I have here. This bears the name of the owner of the creamery, shipping station (county and State and railroad), states at what time the milk is shipped, how many hours in transit on the train, the nature of the water supply in the creameries, the number of cans per day, the number of quarts in bottles. A good many bottles are shipped, but the Board has a very strict rule about bottles. Then below you have the name of the farmer, number of cows, breed of cows, system of water supply for washing cans, etc. The rules which govern these things are very strict. I won't go through all of them. With regard to their skimmed milk, the rule is this, the first rule of the sanitary code governing milk: —

SECTION 186. No milk which has been watered, adulterated, reduced or changed in any respect by the addition of water, or other substance, or by the removal of cream, shall be brought into, held, kept, or offered for sale at any place in the city of New York, nor shall any one keep, have, or offer for sale in the said city any such milk.

With regard to bottling in the city: —

Milk must not be transferred from cans to bottles or other vessels on streets, or on ferries, or at depots, except when transferred to vessel of purchaser at time of delivery.

And further with regard to the bottle business: —

Milk shall not be sold in bottles except under the following rules: —

Bottles must be washed clean with a hot-water solution of soap, or soda, or some other alkali, and then with hot water before filling with milk.

Bottles must not be filled except at the dairy or creamery, and in the city only in rooms so situated as to prevent the contamination of the milk by dust from the streets or other impurities.

Bottles must not be washed or filled with milk in any room used for sleeping or domestic purposes or opening into the same.

Regarding store licenses: —

Store permits must be posted in stores so that they can be easily seen at all times.

Of course, as everybody knows, all rules and laws depend for their value upon the way in which they are carried out. But I was given to understand that in New York these rules are carried out with marked success. Dr. Martin, to whom I am especially indebted, seemed to me to have an admirably equipped department admirably administered.

My time, I see, is gone; and I ought to stop here. But I want to make just one remark upon the recent report of Mr. Whitaker, of the Milk Producers' Union. Mr. Whitaker, after saying that the year has been an excellent one for production, says that there has been, if anything, an overproduction, and yet not quite that. Here are his own words, "One cause of the surplus in Boston is under-consumption." Mr. Whitaker goes on to say that the public does not realize the food value of milk. I should doubt that. It seems to me the public has been brought up to believe that milk is the one thing we can rely on, that it is remarkably cheap and digestible; that if we want a convenient, cheap, and digestible food, milk meets those requirements. But Mr. Whitaker says: "The public does not appreciate and realize the food value of milk. When hard times come on and economies are necessary, milk is regarded as a luxury to be curtailed." I doubt that very much. "Truer economy would insist on using more milk and less meat. The consumption of milk has been decreased by the increasing use of condensed milk, which comes from greater distance, and by the increasing use of cream," etc.

Now I think one great reason for the diminished use of milk — for Mr. Whitaker shows there is actually less of it used *per capita* than before — is that the public is beginning to get waked up on this matter. The public is beginning to feel anxious about the sanitary condition of milk. I confess I have done a good deal to stimulate that uneasiness, and I intend to continue doing it; for I believe that the milk-supply problem is one of the very serious things of the day, from a sanitary point of view. And instead of claiming that the public does not understand the value of milk, I think it would be a great deal better for persons interested to try to take pains to assure the public that the milk is in the best possible sanitary condition. I think there is grave danger that the public shall lose confidence in milk. At a meeting which I attended a few evenings ago some one suggested that the only safe attitude in regard to milk is total abstinence. That, certainly, if it became common, would diminish the use of milk still further than it has been diminished thus far.

There are many other interesting points in this subject which I should like to touch upon, with regard to the standard, for example. It seems to me that Mr. Whitaker is very wise there. He does not believe in any reduction of the standard, because that would let in more milk, and milk of lower grade.

The conclusion of this whole matter, as far as I am concerned, is that, in my opinion, the detailed administration of the milk business leaves much to be desired. What, then, are the remedies? That, of course, is always the difficult thing. How can we provide any adequate protection of the milk supply? After talking with a good many different people and thinking the thing over a good deal, I have about come to this conclusion: The local board of health in any city interested in the milk supply has got to make rules that no milk shall be sold in that city which it has reason to regard as suspicious. And, in order to determine its condition, it has got to employ skilled veterinarians and sanitary inspectors to visit the farms and see that things are done there somewhat as they should be done. Whether they can add to that successfully chemical and bacteriological examination remains to be seen. I do not think that that question can be settled off-hand. But I think it has got to

come down to this: If any community wants to be sure of the excellence of its milk supply, it has got to put in the hands of its own board of health authority to exclude from the city or town all milk concerning the character of which the board of health is not well satisfied upon reasonable scientific grounds. And it has got to provide that board of health with money enough to employ the necessary assistance to carry out such inspection and regulations. Take Cambridge, for instance. That is a case I have in mind. No milk ought to be delivered in the city of Cambridge about which the Board of Health has not a good deal of information. It is simply a question of expense and proper administration to look after the farmers supplying Cambridge. Tell the milkmen, "If you want to send milk to Cambridge, you have got to clean up, you have got to have your cows examined by our veterinary, you have got to satisfy us, from the cleanness and the freshness of your milk, that you are doing your best." It may be that the board of health in question must be able to prove the presence of dirt or decay or some other unsanitary condition in the milk as it arrives; but I fancy it would be sufficient to publish lists of approved dairies, and let the citizens do the rest. Then the dealers must either meet the requirements or send the milk somewhere else. I see no escape at present from something of this sort. It is expensive. It involves further administration on the part of boards of health, but I believe it is a sanitary necessity which is coming upon us now very fast.

The President.— Before proceeding to the discussion of this very interesting paper of Professor Sedgwick's, I will submit to you the report of your Nominating Committee, Dr. Gage having unfortunately been obliged to leave the room. They present the following names:

President.

Henry P. Walcott, M.D.

Vice-Presidents.

S. H. Durgin, M.D. S. W. Abbott, M.D.

Secretary.

Edwin Farnham, M.D.

Treasurer.

James B. Field, M.D.

Executive Committee.

J. C. Coffey, Esq. W. H. Chapin, M.D.
J. A. Gage, M.D. H. L. Chase, M.D.
R. L. Newcomb, Esq.

What action will you take upon the report of your committee?

Dr. Durgin.— I move that the Secretary be authorized to cast the ballot of the Association for the officers named.

Dr. Durgin's motion was unanimously carried.

The President.— The Secretary informs me that the ballot cast for the officers of this Association contains the names which I have read to you. The discussion of Professor Sedgwick's paper is now in order. Dr. Chapin may possibly say something to us upon that subject.

REMARKS OF DR. CHAPIN, OF SPRINGFIELD.

It seems to me that the first thing to be done to prevent the contamination of our milk is to educate the people. There never was so good a thing happened to the city of Springfield as the epidemic of typhoid fever in 1892, and the appearance of Dr. Sedgwick in search of the cause, the appearance of the health officers from house to house, asking everywhere about the milk. The prolonged search, which was a great bother to both Professor Sedgwick and myself, was in the end a good thing; for, when we got through with a two months' search for the cause of the epidemic of typhoid fever, nearly everybody in Springfield knew that in some way or other, at some times, milk does make people sick. And they have not forgotten it. And, what is better than that, all milk dealers except the one that peddled this milk believed the same thing, too, and they still believe it. And I have had more than once, and more than ten times, perhaps, in the last two years, a milk dealer come to me personally and say, "Doctor, I am a little suspicious about a case of sickness over

in Suffield, Conn.; and would you mind going down there with me?" "Oh, no; not at all. I should like to go." And I would go down there, and either condemn the farm as being infected with a contagious disease or pass it by as probably free from such contagion.

Last summer, about the first day of June, I had reports in one day from two physicians. And, by the way, the physicians got educated, too; everybody took part in that education,— nothing like stirring things up. On one day two physicians reported to me as follows: Dr. A. stopped me on the street. He said: "I have two families in which there is typhoid fever. One has three cases, and the other four. They are both supplied by such a milk dealer." Ten minutes after that I had another report from another physician, that he had a case of typhoid fever which he had found out was supplied with milk by this same milk dealer. They had taken the pains to do the search work for me and to report to me. The result was that in about three hours from the reports of those cases I had the case of typhoid fever which produced an epidemic of about eighteen cases. Within three hours of the first report I had the case located. As I say, the education of the people, of the physicians, and of the milk dealers, is the thing to begin with. But with all sorts of education there will come a case now and then where milk will be polluted, without any possibility of help. For instance, in the epidemic which I have just mentioned, a servant-girl began working on the farm on the third day of May, and on the twenty-first day, or about the twenty-first day, of May, she went away from the place sick, having been on the farm only three weeks. So far as the people on the farm knew, she had malaria. And they were honest about it. I traced the case back to Springfield, where she was then residing, and found her on a sick-bed with typhoid fever, as I expected she would be. I judged from the number of cases that she helped with only one or two cans; in some way or other she had to do with only one can, I think, and there were about ten families infected with typhoid from that cause. Now, no amount of caution would prevent that, that I know of. But when the people of the State, and the people of Boston particularly, look upon raw milk as being as bad as raw beans, then we shall be a great deal better off than now. I wouldn't

drink a glass of raw milk. I have had enough of it. I had four weeks on my back from it. I had typhoid fever. So, I say, educate the people in the city, the consumers of milk, to the belief that milk is a danger; teach them that sterilized milk is better than raw milk, and let them demand of their dealers that their milk shall be properly prepared.

In order to get at the farmer, it seems to me that a better way than to put the matter in the hands of local boards of health would be to appoint a district inspector of dairies. It is not necessary to examine every dairy in one day; and one inspector might cover considerable territory. If he did that, inspecting the cows as regards the health of the cows, particularly in regard to tuberculosis, cleanliness of the stables, and cleanliness on the farm, we might possibly educate the farmer to keep them clean. What time in the morning do you suppose the average farmer washes his hands for the first time? I suspect about breakfast time, after the milking is done. All milk that contains sand, manure, hair, ought to be rejected without any question whatever, as being filthy. And yet people will take that kind of milk without making much fuss about it. They do not look upon a teaspoonful or so of cow manure in the bottom of a quart-cup as very bad. Possibly they may say something the following day to the milkman about it, but they take the milk just the same. I think that is true,— I know that is true. I was brought up on a farm. The most sensible food that we have upon our tables is produced in the filthiest localities possible. Now, no farmer ever thinks, as far as I know, of ever washing the cow's udder or of washing his hands before he goes to milking. I think there are some cases where they do, but they are few.

THE PRESIDENT.— Dr. Chapin, I hope your namesake of Providence can give us some more assurance of a better condition of things in Rhode Island.

REMARKS OF DR. CHAPIN, OF PROVIDENCE.

When Dr. Chapin said that he did not think the farmers washed their hands until breakfast time, I felt like offering an amendment.

We have in Providence recently established a model dairy farm, which I think *is* a model farm. And near by it is one of the old-fashioned kind. But the man on the old-fashioned farm felt that, if the model farm was going to start in and run competition against him, he would have to do something. So he determined to furnish milk which would be as clean as the other man's. I visited his farm and saw the men at milking time. I had just come from the model farm, and knew how they took care of the cows' udders and sterilized their glass jars, etc. And so I asked him various questions as to what he did. I asked him if they wiped the cows' udders, and if the men washed their hands. And he said yes. And I examined the men's hands, and I concluded that instead of washing them before breakfast they washed them about supper time, the time of the last milking. He told me that they always wiped off the udders with a dry cloth, because a damp cloth was bad for them. I asked him to step to the barn and show me the cloth. He stepped to the barn, and said, "Bill, where is that cloth that you wash off the udders with?" The man said, "I don't know." He said, "You are sitting on it." He said, "No, that is it out there." He got it and showed it to me. It was full of dust; it hadn't been taken down for a couple of months. So I think things are even worse in Providence.

I think you will find that Rhode Island people usually come to Massachusetts to receive rather than give. I came down here to receive information, and I have received a good deal of very useful information in regard to the management of the milk supply. And it seems to me that the difficulties have not been exaggerated. So what we have to do, if we want a milk supply which is clean and free from disease, is to make all the people that handle that milk, from the time that it leaves the udders of the cows until it is delivered to the customers, clean. And that is quite a contract. We have got to make them clean. If they will be cleanly, the dangers of receiving contagious diseases will be reduced to a minimum; though, even if they are cleanly, we cannot get rid of the danger entirely.

The points which Professor Sedgwick alluded to in regard to the different ways in which milk is delivered in different cities impressed me a good deal, as I was thinking of the way it was delivered in

Providence. It is quite different from the way it is delivered in Boston. Most of the milk in Providence is brought from the farm to the customer in a ten-gallon can. Some of it is brought in on the cars and mixed by the milk dealer, but very little of it. Most of it is either brought in in wagons or in cars in ten-gallon cans, and at the door is poured into the customer's measure.

We have not had much contagion due to milk. We have had within the last ten years only two or three epidemics, only one of which could be positively traced to the milk supply. It seems to me the chief way we can guard against this is to secure through the whole district from which the milk comes a thorough control of contagious diseases. When I said that Rhode Island people expect to receive from Massachusetts, I did not mean they expected to receive contagious disease. But it sometimes happens that in Providence we are liable to receive that very thing. I have at the present time a milkman who lives in Massachusetts, who has a case of scarlet fever in his family. He is still delivering milk, because I had a consultation with his physician and found that the case was very well isolated indeed, so that there was no danger in his continuing to deliver the milk. Last fall I learned of a case of typhoid on a milk farm in Massachusetts; and in that case I was not at all satisfied that it would be safe to have the milk brought into Providence, and I notified the man that he should not do it, and he did not do it. I also notified the secretary of the State Board of Health of Massachusetts in order that he might see that the milk was not delivered to customers in Massachusetts. I believe it was fed to a hog.

It seems to me that the only thing that we can do is to do that very expensive thing which Professor Sedgwick has suggested,— that we shall have a constant inspection of the sources of milk supply.

Dr. Chapin, of Springfield.— I should like to mention a fact that happened within the last two years in Springfield. A cow was quarantined for tuberculosis. The farmer was somewhat sceptical. He was obliged, however, to throw away the milk, and fed it to some kittens. The kittens are dead, and the autopsy has shown tuberculosis. And the farmer is converted.

The President.— Perhaps Professor Ernst will help us out.

REMARKS OF PROFESSOR ERNST.

Most of what I should have liked to say has already been said, so that there is very little left for me to add.

In regard to the general subject there does not seem to be any question that there is but one way in which the milk supply can be regulated and improved; and that is, a campaign of education so far as cleanliness is concerned. The stories that I have heard, and what I have seen of the surroundings of cows and of places from which the milk comes, are something almost unbelievable. The knowledge upon the subject is at such an extremely low ebb that I agree with Dr. Chapin in the feeling that it is a difficult problem to solve, a difficult matter to bring to a successful conclusion.

There are one or two points that struck me in what Professor Sedgwick said,— one in particular, laying so much stress upon the disadvantages of mixing milk,— that are so entirely contrary to my own feeling that I thought I would speak of them. The fact of mixing milk, it does not seem to me, is a matter of so much importance, provided this question of cleanliness is sufficiently well understood. The advice that I have given to my patients for years, and especially in feeding children, is, if they cannot get their milk supply from a single cow that they know, to be sure not to depend upon a milkman's single cow's milk, for the very reason that, if the cow be affected, for example, with tuberculosis, the chances of infection from a mixed supply seem to me to be very much less than the chances of infection from a single supply,— in accordance with experiments which are so well known, showing that it is not only the variety of the infectious microbe that is used, but the size of the dose that determines the results. So that, if the conditions of cleanliness are fulfilled, it would seem to me it is a little better to have a mixed supply than an unmixed. The forty-quart cans spoken of must contain mixed milk, and it must be mixed somewhere, because no single cow ever gives such a supply of milk; and in the creameries in New York State, outside of the city limits, the milk must be mixed there in order to fill the forty-quart cans.

There is another point of interest to me, from a scientific point of view, but I think Professor Sedgwick has already given the answer

to it. I have been interested to know whether, in any of his investigations, he has ever found in any of these cases the specific microorganism of typhoid fever. I understood it was distinctly stated that the evidence was circumstantial entirely, but I wished to be sure that there is no direct evidence.

I think Dr. Chapin, of Springfield, insisted upon the use of sterilized milk at all times, which rather roused me, because I believe that the fad for sterilized milk has done more harm than it has good to the digestive apparatus of the coming generation. I think the use of sterilized milk on all occasions for children is a great mistake. I speak with feeling about it, because, so far as I know, the first sterilized milk that was ever used in this country was given to a patient of mine; but it was used for a definite purpose and with a definite idea of obtaining results in that case. I agree most heartily with Professor Sedgwick that the campaign of education, as regards cleanliness in the handling of the milk supply, is a necessity; but I believe it to be a great mistake to sterilize milk at all times for healthy babies, because it puts what seems to me to be an entirely unnecessary strain upon the digestive apparatus of those using it, especially of children. I do not think children should be fed with sterilized milk unless there already exists some disturbance of the digestive apparatus, when the object of the sterilization is to prevent the addition of further ferments to the excess already present.

The President.— I suppose we shall all have to admit that there really are two sides to this question; that, while there is milk which is not looked after and not cared for and not conscientiously treated, there is fortunately a certain amount of milk which receives everything that conscientious care and intelligent supervision can give to it. And I am going to ask our guest, Mr. French, to tell us something about that. No man knows more about it than he does.

REMARKS OF MR. FRENCH.

Mr. President and Gentlemen,— I have been very much interested in the milk question, I might say ever since I was an infant; and I do not know that it is necessary to go back any farther than that.

If I was to take any text on which to speak to-day, it would be some resolutions which I had the honor of offering at the annual meeting of the Bay State Agricultural Society, which was held here on the 20th, and which read something as follows: —

Whereas the object of all laws in relation to contagious diseases in cattle is for the protection of the consumer of meat and the products of the dairy, and whereas a large amount of milk from other States is brought into the State of Massachusetts without any guarantee as to the freedom from disease,

Resolved, That our present State laws are insufficient, so far as they give no adequate protection to the consumer from milk from diseased herds outside of our State;

Resolved, That the Bay State Agricultural Society hereby offer a petition to the legislature now in session to take such action as will authorize the State Board of Health to make such regulations for the importation and sale of milk as will protect the inhabitants from the consumption of milk from diseased cows.

Now, I am assuming in this, or have assumed, that the State laws now were not sufficient to authorize the boards of health to take action in relation to milk outside of the State. Whether this could be done by ordinance or not, I am not prepared to say. In the city of Minneapolis it has been done by ordinance, and that ordinance has been sustained there in the State of Minnesota by the action of the Supreme Court. I have here a decision by the Supreme Court of the State of Minnesota, sustaining the milk and dairy ordinance of the city of Minneapolis providing for the inspection of dairy herds outside of the city and the use of the tuberculin test. Now, of course it is different in the city of Minneapolis, because a large portion or probably the whole of the milk that is brought into the city of Minneapolis comes from the State of Minnesota. Of course we cannot enact what might be called an extra-territorial law here which would govern the milk supply or regulate the milk supply in other States. But we do know here that as high as 40 per cent.,— it is so estimated by the Dairy Bureau,— as high as 40 per cent. of the milk that comes into the city of Boston comes from outside of this State. It comes from the State of Maine where, until a short time ago, it was supposed there was very little tuberculosis. And now it is estimated as high as 20 per cent. Large quantities come from that State. There are carloads of milk which come from New

Hampshire, and likewise from Vermont. I believe there are two carloads of milk that come from Connecticut. Now, under the general laws, as I understand, of the State of Massachusetts, the State Board of Health has power to inspect milk so far as adulteration is concerned and so far as they can detect disease here. But they have no authority, at least I assume they have not, to lay down laws and regulations in regard to the sale of milk in the city, so far as suspecting disease is concerned. We do not propose to interfere at all in any such legislation as may be desired with reference to what might be called the Interstate Commerce law. We would not say that you cannot bring any milk here. We cannot prevent carloads of milk from being brought in here if you choose. But what we want is that the State Board or the city Board of Health here in the city shall be able to say, if they are not already authorized so to say, that the milk when it comes here is under their care and inspection,— that is all. Of course you can detect adulteration, but you cannot detect disease until some unfortunate victim has been afflicted. Now, what we desire is, if a law is necessary, to have a law that will give the State Board power to say, "You may bring in all the milk that you want here, but, when it gets here, it is under our inspection," and to allow them to lay down such rules and regulations as shall govern it when it is here as they have done in Minnesota. Say to the milk contractors and to the milk dealers, "When you bring your milk in here from outside the State, you must be subject to these regulations."

Here is this great loophole. We pass laws here in regard to our own cattle and our own cows,— pass those laws here at the State House, and say to the farmers here that they must have their herds inspected, and that they must not send milk from diseased cows; and yet we allow this large percentage of milk to come in with perfect freedom without any inspection whatsoever. Now, we want the State Board to be allowed to lay down such regulations that they can say to the contractors and milkmen who bring in milk here from outside of the State, "You must prove to us that the milk that you bring in from outside of the State is not from diseased herds; that the sanitary conditions are likewise proper."

Now, that is the point, Mr. President, that I wish to emphasize, so

that the milk from the dairies outside of the State that comes in here shall be accompanied by certificates from the State Cattle Commissioners or from the sanitary inspectors there, or from veterinary authority of some kind, that every dairy that sends milk in here from outside the State shall be inspected at least twice a year, and that the milk shall be accompanied with proper certificates, stating that the herd from which it comes is kept under proper sanitary conditions, and that the cattle are not diseased.

I do not know, Mr. President, that I have anything more to say except, if the boards of health consider this of sufficient importance, and if they have not sufficient power or authority at the present time, as I have assumed they have not, to do this thing, the Bay State Agricultural Society and other societies, I think, will be very glad to co-operate with them in asking for more legislation if it is desired. But it does seem to me that this is a matter that has been overlooked. Certainly I have never heard it discussed or talked of in any of the milk meetings of the milk associations or any other assemblies, in relation to this large amount of milk that is brought in from outside the State without any guarantee as to freedom from disease.

CLOSING REMARKS OF PROFESSOR SEDGWICK.

I might say just one word, perhaps, in the way of closing the discussion. It seems to me that the secret here is, just as it is everywhere else, a campaign of agitation and education. It is not that we are prejudiced against the farmer. Most of us are closely connected with the farming community, and have ourselves, perhaps, as Dr. Chapin says, been brought up on farms. We know the difficulties in the way, and we dislike to put burdens upon people who are little able to bear them. But sanitary science has its requirements; and an enlightened public opinion is going to demand a much more careful supervision of all this matter of milk supply, unless I am very much mistaken, and that in the near future.

Obviously, it would be unwise for any State to enact strict rules for the governance of its own citizens, and then by some loophole allow citizens of other States to bring into the State materials which it would not tolerate from its own citizens, if there is any possible

way of preventing it. And I think we are indebted to Mr. French for calling our attention to this side of the matter.

With regard to the whole question, it seems to me we want to take this ground: We have got to be patient. Milk supply is a primitive industry. It goes back to the time when man led a pastoral life and lived with his flocks and herds. The good opinion of milk is based on that long acquaintance and experience with it. We still believe, as Dr. Ernst very wisely says, that, if only we could enforce cleanliness, all things would be well. The secret of modern sanitation is in one simple phrase, "Be clean." It is so in antiseptic surgery, it is so in everything sanitary.

In regard to mixing milk, which Dr. Ernst has referred to, it was not so much that I had in mind the mixing of the milk of different cows in the same dairy — though that of course is objectionable — as the mixing of the milk of the different dairies. So that, if there was a case of typhoid fever or scarlet fever upon one dairy,— I was thinking more particularly of human diseases when I spoke,— there would be trouble; and I meant diseases arising in that particular instance from a human being through the mixing of the milk from different dairies. That seemed to me, and does still, very objectionable, although I see the point, of course, of diluting the germs. However, under the Boston system you must bear in mind that the milk is kept in the little can after it is thus diluted; and the chance is that the germs are going to grow more or less.

I forgot to say, what I am very glad Dr. Ernst stated, about pasteurized milk. Sterilized milk is somewhat under a cloud, as he says, as being comparatively indigestible, besides the reputation which it must bear of, rarely, producing scurvy; and pasteurized milk, probably to a less extent, also. At the same time there are nations, I believe, which live upon boiled milk and are thriving. And it is here, it seems to me, simply a question of choice whether we should have more damage or less by sterilizing or pasteurizing than we now have with raw milk. There are grave dangers no doubt connected with the indigestibility of cooked milk. But those dangers are trifling, it seems to me, compared with those which pertain to raw milk. If we could get raw milk, as Dr. Ernst says, that is in its right condition, fresh and clean, I think I should be dis-

posed to agree with him. But the human race being what it is, and the historical development of mankind being what it is, I can simply say that personally I never think of drinking any milk that has not been boiled or pasteurized. The results of pasteurizing, from a bacteriological point of view, are very striking. We can reduce the number of germs from millions down to units by comparatively slight pasteurizing. And it seems to me that this is a very great safeguard, although we must always bear in mind, of course, the possible danger of occasional cases of scurvy, and those other things which enter into the problem.

Dr. Durgin.— I think this interesting address and discussion this afternoon must have impressed every one present with the need of some action. And, in order that we may pursue this subject farther and get the best results from it, I want to move that a committee of five be appointed by the President, who shall draw up a set of rules for adoption by boards of health within the State, and also a set of rules for investigating cases and epidemics of disease which may result from such polluted milk. I make that motion.

The motion was then unanimously carried.

The President.— I will designate as the members of that committee Professor Sedgwick, Dr. W. H. Chapin, Dr. Burr, Mr. Parker, and Mr. Gove.

The next business upon our programme is a paper upon the "Danger from Lingering Diphtheria Bacilli in Convalescents from Diphtheria," by Professor Ernst. I have the pleasure of introducing him.

ADDRESS OF PROFESSOR ERNST.

Mr. President and Gentlemen,— I am sorry to say that I have no paper to present to you this afternoon. When Dr. Durgin spoke to me about speaking on this subject several weeks ago, I asked very earnestly to have it put off until some actual evidence in regard to the matter might be secured. But it seemed to him to be one of so much importance that it would be better to say what little I have

to say this afternoon, and then, perhaps later, give what evidence we may collect from an experimental point of view. So I shall detain you only a very short time to-day, the especial point under discussion apparently being how far boards of health are justified in enforcing quarantine upon patients convalescent from diphtheria, upon the ground of the persistence of cultures of the bacilli of diphtheria in the throat after all symptoms have disappeared. These cases are apparently becoming more and more annoying at the offices of the boards of health. I do not know whether they are becoming more numerous so far as concerns the office or not. Certainly, they do not become more numerous so far as our experience in carrying on the culture diagnosis goes. The particular point, of course, in justifying the insistence upon quarantine after all the symptoms have disappeared, lies in the question of the virulence of the bacilli that are found in the throats of such persons; and that is the particular point upon which very little evidence is yet obtained. There has been plenty of experimental work done as far as testing the virulence of bacilli that have lingered in the throats of patients for one, two, or three weeks; but those are not the cases in point. What are under consideration are the cases that are detained in quarantine four, five, or six weeks, or longer. It seemed to me that I had a number of such cases upon the records during the last year; but, on the contrary, I find there are only a very few. I mean where the virulence of the cultures has been tested in these prolonged cases. It has happened a number of times, in cases of persistent bacilli, that we have been requested to test the virulence of the cultures; but, before we could get the test made, negative cultures have come in, and the patient has been discharged from quarantine, so that the work has not been completed.

As to the frequency of these prolonged cases, I feel at liberty to quote something that I said in my report to the Boston Board of Health last year, as follows: "Complaint occurs in cases of diphtheria in which cultures have persisted and quarantine has been enforced upon patients for what has seemed to be an unreasonably long time; and from what has been said it might be thought that this happens more frequently than is actually the case."

Then, in order to demonstrate that this was true, I made out a table from all cases sent in to the laboratory at the medical school from Sept. 1, 1895, to Jan. 1, 1896. That, of course, is a year ago, but a very rough casting-up of the amount this year shows the proportions hold about the same. In those four months there were sent to us 2,443 cases. Out of these 2,443 cases for examination, 909 showed the presence of bacilli of diphtheria. Of those 909 the bacilli persisted over two weeks in 116 cases. But 63 of the 116 were discharged in from two to three weeks; 30 in from three to four weeks; 11 in from four to five weeks; 7 in from five to six weeks; 4 in from six to seven weeks; and 1 was detained in quarantine, or at least showed the presence of bacilli for a period of time between seven and eight weeks. That is, 1 out of 909 cases. And it appears also from a summary of this table that 93 were free at the end of four weeks, 93 out of 116; and that only 23 out of 909 were kept in quarantine for a longer time.

Now, taking into consideration the fact (for it is a fact so far as our records show) that a very large number are discharged in less than two weeks,— a much shorter time than was formerly considered wise,— and the added safety that is given by keeping these delayed cases under observation, it does not seem as if any reasonable person should object, even at the expense of apparent hardship in a few cases. Such apparent hardship is certainly for the benefit of the community and the associates of the patient as well. But it seems that it is these few cases that make the trouble, and of course it is a question as to whether it is justifiable to keep them under observation and under control upon the mere presence of the bacilli. This can only be determined by a series of experiments upon the virulence of the bacilli found in the cases of persistent bacilli sent in to us; and that particular point is the point that we have not yet had time to work out. In general, it is only possible to say that in practically every case that I have found in the literature of the subject, where there has been any experiment made, the test of the virulence has been made within two weeks of the date of the first culture. But the point is to be made that also in practically every case of this kind the bacilli have been shown to possess a marked degree of virulence by the fact that the guinea-pigs inoculated have

died within four days, and generally within forty-eight hours, which is a high degree of virulence. Where the dose of the injection is noted in such cases on our records, it has always been in the neighborhood of a tenth of a cubic centimetre and in a large-sized guinea-pig,— an adult guinea-pig, one weighing from five to seven or eight hundred grammes,— which is very much more difficult to affect by the injection of such a culture than a guinea-pig of a younger age and smaller weight. So that it would seem, so far as these few statistics go, that we have been able to get, that the virulence of the bacilli in this short time may be assumed. Now, on the other hand,— and these are the particular cases under discussion,— there have occurred a few cases in which the bacilli have persisted for a long time and in which the inoculation test has been made. I have, of my own, four; and, in looking up the literature on the subject, I find only two where, in these prolonged cases, the virulence of the cultures has been tested. There may be more, of course; but I did not happen to run across them. One was some two or three years ago, by Martha, who found the virulent bacilli in a case of a convalescent from diphtheria, in which the symptoms had entirely disappeared, nine weeks after the disappearance of the symptoms.

Biggs, in 1894, reports a case of persistent bacilli, and virulence shown seven weeks after all the symptoms had disappeared.

And, as I say, there may be others. I wrote to New York last week, hoping I should be able to get their latest statistics, but I have not yet received their reply.

Of the cases of our own, one was first sent in to us on the 5th of January, 1896, and the cultures came in on the 22d and 31st of January; on the 9th, 19th, and 28th of February; and the 11th and 20th of March. On the last date the culture was negative. On the 11th a guinea-pig was inoculated, and the virulence of the culture was demonstrated without question, the guinea-pig dying in forty-eight hours.

Then comes our most remarkable case, which I think Dr. Abbott matched just before we came in to dinner. This is the most prolonged case that I know of, the first culture having been sent to us on the 25th of April, last spring, and cultures coming in on the 28th and 30th of April (all of them positive, all of them showing bacilli of

diphtheria, except where I shall speak of it); on the 5th of May, the 10th, 12th, 17th, 26th, and 30th of May; on the 2d, 5th, 7th, 9th, 11th, 13th, 16th, 18th, 19th, 20th, 21st, 23d, 25th, 26th, 28th, 30th of June; and the 2d, 7th, 9th, 14th, 21st, 25th, and 28th of July; the 4th, 11th, 19th, and 25th of August; the 1st, 9th, 15th, 22d, 29th of September; and the 5th and 6th of October. And on the last two dates, the 5th and 6th of October, we got two successive negative cultures. The middle of September — that is, nearly five months after the symptoms had disappeared — the culture from that throat killed a guinea-pig in thirty-six hours, one of the most virulent cultures that we have had to deal with.

The third case was sent in in November of last fall; and then on the 28th of November; the 5th, 12th, 18th, 23d, 29th of December; and 3d, 6th, and 13th of January of this year. A guinea-pig inoculated with the culture January 3 died in forty-eight hours. On the 13th we got a negative culture.

Another case, coming in on November 20; cultures were sent in on the 26th and 30th of November; and on the 2d, 4th, 6th, 8th, 11th, 14th, 17th, 19th, 22d, 24th, 27th, and 31st of December; and on the 2d, 5th, 10th, 13th of January of this year. On the 16th there was a negative culture; and the culture made on the 13th did not kill a guinea-pig, so that the test showed that the case might have been discharged; but the case was discharged because of the entire disappearance of bacilli before we could complete the experiment. So that, so far as I can present any evidence, it would appear unquestionable that these prolonged cases do, as a rule, present bacilli that are virulent upon cultivation and inoculation.

The point that has been raised, that the bacilli while in the throats of persons where all symptoms have disappeared are non-virulent, and that their virulence is brought back to them by the inoculation experiment, seems to me to be not well taken, because, as far as I know, no increase of virulence ever occurs in bacteria except by being passed through living tissues. The increase of virulence, therefore, does not present itself in the preparation of the pure culture before injection is made. I know of no way by which the virulence can be increased by simple transfer of the bacteria on the ordinary nutrient medium. They either retain their virulence or lose

it: they do not gain. Therefore, the objection that these inoculation experiments are not reliable so far as demonstrating the virulence of the bacilli is concerned does not seem to me to be a proper one.

I am sorry that I have not more evidence to bring before you; but, from what little I have, my impression is a strong one, and I think others working in the same line agree with me, that these cases of prolonged diphtheria probably are even more dangerous sources of infection to others than those in which the symptoms are more marked, for the reason that, the symptoms being entirely gone, the patients do not realize that, while they are not dangerous to themselves, they may very probably be sources of infection to others, and particularly to children with whom they may come in contact and upon whom they may confer caresses.

Dr. Durgin.— I should like to add just one word to the force of Professor Ernst's remarks, and that is this: I think that one of the chief objects of this Association is, through the discussions, to bring about a uniform method of applying regulations throughout the State. If one board of health has a regulation or a rule to apply concerning contagious diseases, all boards throughout the State should have a similar one in order to strengthen one another. One board of health quarantines diphtheria cases until a negative culture has been obtained. A neighboring board of health does not do it. And in a short time there is discontent growing out of the laxity in one case and the stringent rules in the other. It seems to me that we ought to agree upon rules which may be applied throughout the State. And here is one of the opportunities. If these bacilli found in the throat are capable of killing a guinea-pig, according to Professor Ernst, they are capable of producing other cases of diphtheria in a human subject, and are therefore dangerous. If one board of health quarantines until a certain time, the other boards of the State should do the same thing. Otherwise, we should all withdraw from that position, the same as in the case of the milk regulations.

It was protested in my office yesterday that these bacilli remaining in the throat for so many weeks were harmless and would not produce the same disease in another individual, even though they had an opportunity to be communicated. I have asked Professor Ernst

to clear up that point; and he has done it well, I think. Still, it was protested that these bacilli were inert until handled by the bacteriologist, when they were cultivated into activity and the fact used against the poor fellow who was quarantined. I hope that that point has been made sufficiently clear by Professor Ernst. It seems to me it has.

PROFESSOR ERNST.— I should like to ask Professor Sedgwick what his experience is in regard to the increase of virulence.

PROFESSOR SEDGWICK.— I do very little in this line and know very little about it; but, what little I do know, I should think Professor Ernst's point was very well taken. It is just as reasonable to suppose — no more reasonable to suppose — that the bacillus is inert in the mouth and virulent a little while after as it would be to suppose that a potato changes its character when it comes out of the cellar, and is not the same sort of a potato it was when it was in the cellar. It seems to me that the thing is absurd on the face of it, a purely gratuitous assumption. If there is any evidence of it, we should like to have it. But, as a bacteriologist, though I have not worked in this particular line, it seems to me Professor Ernst's position is perfectly sound.

THE PRESIDENT.— Is there anything more to be said upon the subject upon which Professor Ernst has spoken to you?

MR. GOVE.— I should like to ask one practical question; and that is, in these cases of persistent bacilli, after an apparent recovery, what, if anything, can be done to hasten their disappearance?

PROFESSOR ERNST.— Did you ask me the question?

MR. GOVE.— Yes.

PROFESSOR ERNST.— I should be very glad to be able to answer it, but nothing that I have ever known has hastened the disappearance. They seem to go when they get ready. I should suppose, unquestionably, that frequent cleansing of the mouth would help. But I doubt very much whether germicides of so dilute a character as it would be justifiable to use are of any value.

PROFESSOR SEDGWICK.— I should like to suggest a practical experiment I have made on other bacteria, not on these at all. Bacilli are very susceptible to certain things; and it did seem to me, as the conversation was going on, that it ought to be possible to de-

vise some antiseptic in sufficient dilution, but of such a character as to do away with these things. For instance, they are very susceptible to some kinds of acids, most of them. And, while I am saying this purely in the air and without any knowledge of the particular bacillus in question, on general principles I should suppose that mouth-washes of dilute acids, dilute enough to hold in the mouth a moment, and perhaps such a thing as peroxide of hydrogen, something of that sort, might help very much. But I really do not know.

Professor Ernst.— Peroxide of hydrogen and washes of that sort have been tried very constantly, and they do lead to a very marked diminution. But, where the experiment has been tried, in the course of a day or two the bacilli will reappear. They seem to be in the follicles of the tonsils where you cannot get at them, and where the application of the various antiseptic washes clears them off the surface. But that is what I meant when I said "sufficiently diluted" to make it justifiable to apply them. In such dilution as that it does not penetrate deeply enough to clear the mouth from these deeper bacilli.

Dr. Chapin, of Providence.— What Professor Ernst has just said leads me to ask him about cases where they are discharged from quarantine when they show one negative culture. We have had successive cultures taken to the State Laboratory, where they examined them and sometimes found a negative culture, and then a day or two afterwards reported a positive culture. Now, I have found such cases in other cities. I know it has been so in Brooklyn and in Philadelphia. And I should like to ask him what his experience is in reference to finding a positive culture one day and a negative culture subsequent to that, and then a positive again.

Professor Ernst.— That sometimes occurs, but it is very rare. It did happen in this prolonged case I read you. At one time in June, in the middle of June, a negative culture came in: the report was sent to the Board of Health; and the agent very promptly disinfected the house, and the patient was freed from quarantine and immediately went out of town. Then the physician, as a matter of curiosity, sent a culture in two days afterwards, and it was positive, and positive for two months, and the patient did not come back to

Boston. The parents did not care to come back, and they kept the child out of town. It did happen in that instance, but it is not common at all.

Dr. Durgin.— I want to say I think most of you, if you should sit in my office one day, would be glad to get a negative culture; and you would hurry to discharge the patient before they had time to get another positive culture. I think, if there is anything connected with the laws in regard to contagious diseases that is annoying, it is in trying to hold on to a case of diphtheria at the end of six, seven, or eight weeks, after all visible signs of the disease have gone; and the parents and all their political friends are after you to get you to discharge that patient and take down the card.

Dr. Chapin.— And the doctor, sometimes.

Dr. Durgin.— Yes.

Professor Ernst.— Generally, the doctor.

Dr. Durgin.— And, if there is anything to be found that will dig out the pockets of that throat and clear away these little bacilli and allow us to pull down the card and discharge that patient, I wish it might be found.

Professor Ernst.— Possibly some physicians may do as a gentleman told me that he had done. I believe he is also a friend of the Board of Health. He told me this in confidence. He said that he could get rid of a patient, that he could work it every time. I asked him how he did it. "Well," he said, "I got a negative culture from you. I took that culture from another throat." And that patient was discharged on that.

Dr. Durgin.— We are accustomed to believe anything that Dr. Ernst sends us, and therefore we shall act upon it at once.

Professor Ernst.— I did not know that, sir, for two months afterward.

The President.— It seems to me, if this meeting goes on much longer, the solid foundations of sanitary science will shake. I think it is about time somebody moved to adjourn.

On motion of Dr. Durgin the meeting was then adjourned.

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[The Association as a body is not responsible for statements or opinions of any of its members.]

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APRIL QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The April quarterly meeting of the Massachusetts Association of Boards of Health was held in Fall River at the Quequechan Club on the afternoon of Tuesday, April 27, the Vice-President of the Association (Dr. S. H. Durgin) in the chair. Dinner was served from 1.30 to 2.30 P.M., after which the Chairman introduced Mayor Greene, of Fall River, as follows: —

Gentlemen, if you will please come to order, as the hour is now getting late, while the coffee and cigars are being handed to you, I shall take great pleasure in introducing to you his Honor, Mayor Greene, of Fall River.

MAYOR GREENE, OF FALL RIVER.

Mr. Chairman, Gentlemen of the Massachusetts Association of Boards of Health, and your Guests,— I am certainly very glad to see such a large number gathered here to-day. I only regret that the

days are not longer, as I frequently do when I am about my business, and that we cannot double them up a little so as to accomplish a little more work.

I am glad to see so many of you here, but should have enjoyed it very much myself to have given you an opportunity to look about the city a little more; for we are down at the border of the State where a great many people hesitate a long time before they come. They frequently say to me, "Well, I have been through Fall River, but I never stopped there"; and any one passing through by rail gets a very slight impression of it, and we should like very much to give you a good impression of Fall River. But I am very glad to extend to you a hearty welcome to our borders, and to say to you that we are deeply interested in the work in which you are engaged. Perhaps we do not show that wholly by our works. Undoubtedly, our Board of Health would say that we do not treat them as liberally as they would like to be treated; but there is no department of municipal administration, I find by my experience, who think they are well treated. They all think we keep them a little short of supplies. In a city like Fall River we cannot avoid that. We are endeavoring to accomplish a great deal with a very little substance to accomplish it with. Our city has grown so rapidly and we find its needs so great that some things have to be slighted.

I realize that one of the things that ought not to be slighted is this great question of the matter of health as relating to the work in which you are engaged. This winter, before I wrote my inaugural address, I took quite deeply into consideration the matter of the disposal of garbage in our city, and thought that I had a plan evolved by which we might dispose of our garbage, and land it over on our sister city, which has got a little in advance of us in establishing a plant to dispose of garbage. We thought, as they had built a plant in anticipation of great growth and had not got where they could use the whole of it, we might assist them in using the plant. The plant being some twelve or thirteen miles away, we thought we could dump the garbage there. We have found that impossible; and, as a consequence, we have not yet evolved a satisfactory plan for the disposal of our garbage. We have had a petition from our Fall River physicians, I think from the Fall River Medical Society,

asking us to consider this very important question. I think we shall be very glad to do that, and we hope something may be done by which we shall be enabled to carry out our original intention.

The gentleman who will speak to you to-day, as I am informed, on this important subject, is the one who has established this plant near the city of New Bedford; and I trust that he will so lay out the work here that we shall become deeply interested, and possibly be able to accomplish all that is desired.

We have on our hands many important questions and subjects which engage the entire attention of our different departments. We have, in Fall River, done considerable in the line of sewers. I may say that since our incorporation as a city we have spent over a million and a half in the construction of sewers, and have never made an assessment upon the abutters or users of those sewers toward the cost of construction or maintenance of them. I think that is rather an anomalous position, not enjoyed by any other city in the Commonwealth. But, lest any one should say, "Well, I don't see how you do it," I will say to you that I happened to occupy the position of mayor seventeen years ago; and, when I read my inaugural address this year, I made comparison of the city of Fall River of to-day with the city of Fall River seventeen years ago, and I found that, notwithstanding the fact that we had spent so large a sum in the construction of sewers, our increase of indebtedness — I refer to the entire debt, water, sewers, etc.— had been but 9 per cent., while our increase of valuation had been 87½ per cent., and our increase of population over 100 per cent. We are, however, suffering under what occurred before the last seventeen years. We had a large increase of debt previous to the last seventeen years, when we had a great growth, so that we are suffering under that; and that makes us a little short of cash to carry out our desires.

We are to-day struggling with the problem of how we can best extend our sewer system; and, if it is possible, I think the government will take up the question this year, and decide that they will provide some means of income from the vast amount that we have already expended in our sewers.

I went to the legislature this year for authority to hire one hundred thousand dollars outside of the city debt, for the purpose of

extending the outlet of our sewers into the bay below. We have the sewers now down to the shore; but we find there is liable to be trouble from their outlets, and we wish to extend them. We asked for authority to hire that amount outside the debt limit; and it was granted with a stipulation that we adopt some plan of sewer assessment, sewer rentals, or sewer betterments, before the first day of September, or our loan would become inoperative. I have been somewhat criticised because I allowed that amendment to be added to the bill, but I am willing to stand the criticism. I believe it is all right; and I realize, what the city of Boston has already realized, that it is impossible to carry on this vast expenditure for sewers without making some provision for a return from it. I think other cities have found that out by experience. I am informed that the city of Boston has authority from the legislature to assess the entire cost of their sewerage system, which is not generally provided by law for cities. The city of Boston usually gets a little extra legislation. I understand that they have asked for and been granted the necessary legislation, their reason for doing so being that they had gone to their limit, and were obliged to find some other means of obtaining what they desired.

Now we are at our debt limit by reason of great growth, and we have to provide a way to take care of what are the actual necessities of the city. It does not make any difference whether we take care of them by the assessment on sewers or in some other way, only in this respect,—that we are limited by the law to the amount we can raise by taxation, and, therefore, if we are going to do anything more, we must either go to the legislature and ask for authority to go beyond the debt limit each year, and from year to year, or provide some means to obtain some income from the money we have expended.

I think that all the people will concur with me in regard to it,—not only the people of this city, but all the people will concur in the idea that the most feasible method is to establish a plan of sewer assessments or sewer rentals.

I bring this subject here before your attention, in order that you may, if an opportunity offers, speak somewhat upon this line of thought. I also do so because there are here present quite a number of physicians of our city who, I know, are deeply interested in

the problem of caring for the health of our people. They have all the business they want to attend to; and anything that will improve the condition of the people who are here with us, and are to live with us and to make up this community, anything that will improve their condition, I have always found that the members of the Fall River Medical Society always give their hearty support to, and I speak to-day in order that they may take strong and deep interest in the subject which is now agitating the minds of the city council, and must continue to agitate their minds. Whether adopted this year makes no material difference, only "it has got to come," as they say in the city of Boston; and every other city will find that they have got to take it and handle it, and they may just as well take it in hand in 1897 as postpone it until 1898, 1899, or 1900, as the case may be. It has got to be handled; and, although a disagreeable subject to some, it is something that has to be taken care of, and therefore I have called your attention to it.

I realize that the time is getting late, and do not wish to occupy too much of your attention. I am certainly glad to see so many of you here, and to see the deep interest that you have in the work of this Association. I trust that this visit that you have made to Fall River will give you a good impression of the city, and that you will not regret the time and trouble you have taken to come among us, and that you will be so well impressed with the city that you will come again. This will be your first visit, but we trust will not be your last. We stand to-day the third city in the Commonwealth, but a step toward the second place. We are aspirants, of course, for the first; but we do not expect to attain that. However, it is always well to aim high; and we are not going to go back. We never have looked back since we started to plough. We are going to look ahead. I am glad to see so many of you present, and to have had the opportunity of saying these few words to you.

The Chairman.— I think we may all sympathize and agree with Mayor Greene in his efforts to obtain sewer assessments in building the sewers of the city. I can speak only for Boston, in saying that up to even a few years ago we assessed upon the abutters three-quarters of the expense; but now we are allowed to assess the entire expense up to the extent of $4 per running foot.

We will dispense with the reading of the principal part of the last records, inasmuch as the hour is late, and ask for that portion of the record which the Secretary finds it necessary to read.

Edwin Farnham, M.D., Secretary of the Association, read a resolution proposing a reduction in the annual dues, as the funds of the Association warrant such a reduction.

The Chairman.— The resolution, gentlemen, is before you. The proposition is that, inasmuch as there are funds enough to warrant a reduction in the annual dues, the dues be reduced from $2 to $1.50 per year. What is your pleasure?

The resolution was seconded, and carried unanimously.

The Chairman.— The following names have been suggested for membership in the Association, and have received the indorsement of the Executive Committee: —

Edgar H. Gammons	New Bedford.
W. S. Kirschbaum	New Bedford.
Henry H. Wilcox	Taunton.
N. B. Aldrich, M.D.	Fall River.
Arthur J. Connell, M.D.	Fall River.
W. G. Brown, M.D.	Plymouth.
William W. Scott	Hyde Park.
Chester L. Lincoln	Fitchburg.

The gentlemen named were declared duly elected. The chairman then read a telegram received from the chairman of the committee "on rules of protection of milk supplies from pollution, and for the investigation of cases and epidemics of disease supposed to result from such pollution," as follows: —

Detained. Please report good progress for our milk investigation. Shall have important and novel results to report later. William T. Sedgwick.

THE DISPOSAL OF GARBAGE.

BY MR. WALTER S. PIERCE, NEW YORK.

Mr. Chairman and Gentlemen,— Among the many evidences of the advancement in civilization in the present age is the wonderful skill exercised successfully in preventing the spread of contagious diseases.

It seems evident now that tuberculosis can be communicated by the dust formed of the dried expectorations of persons affected with that fatal disease, hence the notices in the cars and ferry-boats of New York City forbidding persons from expectorating on the floors of public conveyances under a penalty of a fine therefor.

Investigations have proven that garbage may become a fruitful source of disease. By garbage is meant the animal and vegetable refuse taken from our tables.

Now the theme upon which I have been invited to address this honorable body to-day is the sanitary disposal of this material, which, though harmless when fresh, may become very offensive and dangerous to public health if not promptly disposed of in a sanitary way. It is a subject that is now receiving anxious consideration by the city authorities over our entire country.

For the past few years it has devolved upon me to give this matter a great deal of thought, and to spend much valuable time and no small sum of money to ascertain the best method for disposing of garbage in an absolutely sanitary way and with as much economy as possible.

To this end I have given the various methods for accomplishing this purpose most careful investigation, and shall endeavor briefly to give you the merits and demerits of each.

FEEDING GARBAGE TO STOCK.

The indiscriminate use of this material as food for live stock has never been continued at but few places for any length of time, for the reason that it has proved to be a fertile cause of disease among

the animals, and finally a financial loss to those who have undertaken it. A party who had the contract for disposing of the dead animals of New York City thought he saw a fortune in taking the garbage from the hotels and restaurants and fattening hogs with it. All seemingly went well for a while; but soon disease developed in his herd, and his two thousand hogs died in a remarkably short time. He experimented for a while longer, but finally gave it up; and to-day he will tell you that, if you desire to kill off your cattle and hogs, a most effectual method is to feed them upon garbage as it is collected in cities. Now there is no doubt in my mind that, if the bread and vegetable matter could be selected out while the garbage is fresh, and fed to animals, they would thrive and keep healthy. The trouble is that garbage is not collected frequently enough to have it reach the animals before it has soured and putrefaction has begun.

BURYING GARBAGE.

The method of ploughing in or burying garbage is a better system, but it must be done promptly and thoroughly; and even then, to keep the land from souring, it must be sown in millet or some heavy feeder to keep it sweet, and prevent it becoming offensive. The objection to this method is that it is too expensive, involving in most cities a long haul and a large investment to obtain land for the purpose, and the endless expense of burying it.

CREMATION.

This system, or method, has little to commend it, being expensive and seldom, if ever, free from offence. It has been thoroughly tested, and has few, if any, advocates at the present day. A committee of gentlemen was sent out at considerable expense by one of the mayors of New York City to investigate the various methods for disposing of garbage. They reported as follows upon crematories, or incinerators: "The claim that any one of them destroys all combustible matter was abundantly disproved, and an interesting fact revealed during one test made in the presence of your commission. The refuse was run into an incinerator, and for more than

two hours subjected to a heat of not less than 2,500 degrees, the refuse being violently stirred for most of the time by means of a pneumatic poker. Crude petroleum and compressed air produced the flame, which was of intense fury. And yet, when the residue was examined, there was found, with other combustible matter, pieces of newspaper which were scarcely charred."

"The same may be said of the failure of these incinerators to destroy the noxious gases."

The committee who made this report had the services of a scientific expert in all their investigations, and cremation was condemned by them.

UTILIZATION OR REDUCTION.

There are several processes or methods for the utilization or reduction of garbage, that is, which extract the grease and make the solid residue into tankage, which is one of the best known bases for a most excellent fertilizer average city garbage contains.

	Per cent.
Water, about	70
Grease, about	4
Tankage, about	26

There is a good market for the grease and tankage. They are both useful and valuable. Now to obtain these products in a marketable condition, and to make the process sanitary and inoffensive, has been the aim of every person engaged in the business. These results are claimed by the advocates of those who use the naphtha process, also those who use steam for the extraction of the grease.

There is no doubt whatever but that garbage can be disposed of economically and in an absolutely sanitary and inoffensive manner by a naphtha process, if the business is managed with as much care and skill as any successful factory; and my candid opinion is that the naphtha process is far preferable to the steam process.

It is a well-known fact that there is no agent which so completely destroys the germs of disease and all animal and vegetable life as heated naphtha; and the fact is indisputable that garbage which has been subjected to this treatment is absolutely disinfected and rendered entirely inoffensive.

It is claimed that steam is effectively used for the same purpose, and this may or may not be true; but it would be difficult to find a scientific man who had given the matter careful consideration, who would not pronounce heated naphtha far more effective than steam. They will tell you that one method is positive in its results, while the other is doubtful.

However, both systems have their advocates. St. Louis, Cincinnati, Buffalo, and New Orleans have adopted naphtha processes; and the plants in those cities have been in operation for several years.

Recently a plant has been started in Philadelphia, one in Bridgeport, Ct., and one on Barren Island, about twelve miles from the city of New York, in which the steam process is used.

The one in Bridgeport seemed to have been inoffensive, but was a failure financially for the reason that only a small portion of the grease was obtained, and there was an unusual loss of the solid matter in the operation.

Those at Philadelphia and Barren Island have not been in operation long enough to judge of their merits.

To dispose of garbage in an absolutely sanitary and inoffensive manner requires the co-operation of the board of health and contractor. The former should do all in their power to procure a separation of the rubbish and ashes from the garbage, and require the householders to keep their garbage pails or cans clean. Upon the other hand, the contractor should collect the garbage in neat, clean barrels, which have a metal cover fitting over the top of the barrel snugly, and as soon as the barrel is filled the cover should be placed upon it, and kept on till it is dumped into the extractor at the works.

It is absolutely necessary that each household should have two receptacles, one in which only the animal and vegetable matter is placed; and in the other one should be placed all the rubbish, such as tin cans, berry boxes, pieces of crockery and glassware, bottles, paper, rags, etc. If these precautions are taken, the contractor is enabled to do his work better and cheaper. It is the mixing with the garbage the rubbish referred to that makes the plant or works expensive to construct and to run.

Collecting the garbage in barrels is unquestionably the best method that has so far been devised; and it is very doubtful as to

whether it can be improved upon, being far ahead of the open metal carts now in use in New York and other large cities, which are frequently seen in the streets with the tarpaulins, or covers, thrown back and a pile of sour-smelling and unsightly garbage exposed to view.

The works or plant in which the garbage is to be disposed of should be a fire-proof building, so that no break in the work can occur; for, should a plant be destroyed by fire, the contractor might find it a difficult, if not impossible, problem to dispose of the garbage in a sanitary way till his plant could be rebuilt, and thus the health of a city be seriously endangered.

The plant should be provided with steam or vapor tight steel tanks on extractors, about ten feet high and six to seven feet in diameter, with a large door at the top for charging and a similar one at the bottom for discharging; also suitable steel tanks for storing the naphtha and holding the grease; also convenient driers for drying the tankage, and proper receptacles for the chemical treatment of the waste water so as to render it harmless, or for evaporating and condensing it.

Now, then, when a load of garbage arrives at the plant, the barrels should be hoisted over the extractors, the covers removed, and the contents at once emptied into the extractor. Each barrel should be immediately sprayed with a disinfectant and deodorizer, so as to be in a clean condition to be used again. As soon as the extractor has received its charge, or load, of five to six tons, the doors should be tightly closed and naphtha introduced. The whole mass should then be heated by a coil of steam pipe within the extractor, the heat should be continued for several hours, till the disinfection by the heated naphtha vapor has been thoroughly accomplished.

It will be found that during this operation the grease has been dissolved, and can be drawn into the grease tank, passing out as a solution of naphtha and grease. Then, by heating the grease tank by means of a coil of steam pipes within it, the naphtha will be volatilized, and, passing through the condenser, is ready, in a liquid state, to be used again. In the mean time the grease has been refined and made pure by the naphtha, and is in the best possible condition to find a ready market.

The solid matter left in the extractor will be found to have some naphtha left in it, which must be distilled off in the same manner as from the grease. It is then ready to be dried and disposed of to fertilizer manufacturers as a most excellent base to make a complete fertilizer, or, what is much better, to be converted into a high-grade fertilizer in the garbage works by adding to it the requisite amount of phosphate and potash.

It is self-evident that this high-grade fertilizer can be supplied to the surrounding farming country at a much less price than if the tankage is shipped to a manufacturer at a distance, and by him taken into his works and made into a fertilizer, bagged, and shipped back to the place it came from.

The most modern method or process for using naphtha for the purpose referred to renders the business perfectly safe, so much so that the most conservative fire insurance companies will take a risk on such a plant as has been described at a smaller premium than on the ordinary soap-works. Naphtha is now used in the largest linseed-oil works in the world for the extraction of the oil from linseed. They use barrels of naphtha where gallons are used in garbage works.

In conclusion, allow me to say that we are on the eve of a period when a well-constructed modern garbage plant will be as much a part of every city's outfit as its gas-works, electric-light plant, and water-works, and a revolution brought about in the fertilizing industry. The farmers of New England and our entire country will be supplied with a most excellent fertilizer at a price so low that the products of the farm will be doubled.

A standard fertilizer at a reasonably low price is the great need of the New England farmer to-day; and his only hope for the supply of it is in the establishment of these garbage plants in the cities. The fertilizer manufacturer will tell you that he sees no prospect of obtaining the material composing a fertilizer at a less price than he has been buying them for during the past two or three years. Consequently, present prices for fertilizers are about as low as they can be sold.

It is not an exaggerated statement to say that the establishment of such garbage plants as have been described throughout the cities

of our country will add at least $100,000,000 annually to the income of the farmers; and every one realizes what that means in the way of general prosperity. So that, gentlemen, this waste material which has heretofore been a nuisance and expense to every city, will be converted into a blessing to the country at large.

THE CHAIRMAN.— This paper is open for discussion.

MR. MORSE, OF NEW YORK.

Mr. Chairman and Gentlemen,— I do not intend to delay the order of proceedings. About four years ago I had the honor of making a statement before this Association in the city of Lynn. I was in favor of cremation myself; and the statements then made were to the effect that reduction at that time was in an experimental stage, that it had great promise and great possibilities, and promised to revolutionize the whole system of garbage treatment in this country, and to add to the farmers' interest very greatly.

The statement made on behalf of cremation was that forty or fifty furnaces in the country were burning up this waste. The process of reduction at that time had only five different exponents,— Buffalo, Providence, Philadelphia, St. Louis, and Detroit. Since that time there have been put into use about fifteen different plants for reducing garbage in the following cities: St. Louis, Buffalo, Cincinnati, New Orleans, Bridgeport, New York, Paterson, Boston, St. Paul, Denver, Milwaukee, and, I think, Providence. At present there are five plants only which are operating successfully out of that number,— St. Louis, Cincinnati, Buffalo, New Orleans, Bridgeport.

The following cities have adopted reduction, and have given up or abandoned the work under great difficulties,— Paterson, Washington, Boston, St. Paul, Denver, Milwaukee, New Orleans, Bridgeport, and Providence.

Now that is the record of the reduction process in this country for the last four or five years. In ten years' time, I suppose, I have been the means of burning up more waste in this country, through the furnaces that I have erected, than any other man. I do not

believe in burning up this stuff. I believe we are burning valuable things which we ought to save, but I think to-day that the process of reduction has not proved itself valuable enough to be taken up by cities yet.

There are sixty-five or seventy cities which are using furnaces for cremation; and they get nothing but 5 per cent. of ashes, worth $5 to $10 a ton. In many cases the product of ashes would defray the expense. It is not always true. We cannot show that in every case, but the burning of garbage by furnaces has gone a great deal further than the art of reducing it and making it a product.

If any reduction works can be brought into use which will show a profit on its own work, independent of the bonus to be paid by the city, then the work is accomplished; but, if, on the other hand, any process seeks to be adopted which must have a bonus from the city of from 15 to 50 cents a ton, then there is a loss.

The statement of Mr. Pierce is undoubtedly true that there is great value in this thing, but the figures produced and shown by every company that has come before the public so far do not show that profit. It has not been proven. The figures reported by Colonel Waring in New York show nominally about $2.40 for every ton of waste; but, in figuring on the actual work and getting money out of it, he fails and breaks down.

Now, speaking from my own experience, as Mr. Pierce has spoken from his, I believe, as he does, that the ideal method for any city in this country to adopt will be this,— to utilize the garbage as far as it can be done. But we must remember that the garbage is only 15 to 18 per cent. of the whole waste. What shall be done with the rest?

If you take the ordinary cart-collecting in this town, as I saw this morning, you will find the valuable part, the garbage part, is only 10 per cent. The rest is ashes, rubbish, refuse of all possible matters that will burn and matters that will not burn. That part of the whole cart which must be taken care of is, say, two-thirds of the whole. You can take the 15 or 20 per cent. and do something with it; but what can you do with the other?

In New York we have got to that point where we are taking from six hundred to eight hundred tons of garbage down to Barren Island; but Colonel Waring finds on his hands more than 35 or 40 per cent.

of other waste that he cannot handle, and he is building furnaces to burn it up.

Therefore, I say this: If any suitable process of reduction can be brought forward, be sure to adopt it by all means. Then add to that, means for disposing of the other combustible waste which will have to be burned, and take that combustible waste and turn it into power to reduce your garbage. That is the economical and only way, and the best way that it can be done.

Now the question of handling this matter is getting to be solved on every hand,— the question of carting and transportation, and how it shall be collected and used. A great many men are working at it, and a great many advances have been made. There are many carts in use which are entirely sanitary,— that is, in New York at least,— and many offensive features have disappeared by employing men and means to do the work well. But the great question we must consider, and which every town must look at, is what it is to cost. A reduction plant costing from $15,000 to $25,000 requires a contract of ten years, and must be carried on all that time to show any profit. The city must pay at the beginning not less than 50 cents per ton. Bridgewater was bankrupted, Washington was in a similar case, where they paid more than 50 cents, and the example in Chicago, where they paid 50 cents, was the bankruptcy of the company, also in St. Louis where they paid $1.80.

Now, on the other hand, if a ton of garbage can be reduced to ashes at 50 cents,— and I think it can,— and the ashes turned into money by selling at $8 per ton, the proceeds being applied for the use of coal and labor, this economy comes: the first cost of the plant is only five, six, seven, or eight thousand dollars.

If garbage can be reduced to a merchantable product, and the man who does it can sell the product at $2.40 a ton, and have the city pay him 50 cents for doing the work, he is making great money out of it. Why should not the city have the benefit of it? Is there an example anywhere where that has been done in any case, and successfully carried through?

Four years ago I stated before this Association in Lowell that a furnace was being built to destroy garbage in the city of Lowell. The furnace has been running now four years, and the cost has been:

for the first year, $1.15 per ton; for the second year, $1.10; for the third year, 90 cents; for the fourth year, 72 cents per ton. Last week's run showed a destruction of 83 tons at a cost of 71 cents, and to-day that city has in its hands a proposition from the builders of the furnace to reduce the cost to 40 or 50 cents. Now there is progress. The same furnace which four years ago cost $1.10 or $1.15 per ton will reduce garbage to ashes to-day at 50 cents. Last year showed a net cost on the whole year of 68 cents. Now, if the cost can be brought to 50 cents by experience, certainly it can be brought below that.

Mr. Chairman, I do not desire to occupy the time. I agree entirely with the gentleman who has spoken that, if it can be done successfully, it is the way to do it,— to reduce it; but I say that in all the experience and time spent in this business, and the money, which will run far into a million of dollars, there has not yet been a single example of a successful garbage-reducing plant that makes money for itself, and does it at a very small cost to the city as compared with cremation.

THE CHAIRMAN.— I notice that Mr. Morse says, "If it can be done successfully"; and I apprehend there are many here who would like to know just what the colonel means when he says, "If it can be done successfully," it ought to be done.

MR. MORSE.— I mean by "successfully" this: First of all, within city limits, it is not to cost anything for transportation. Second, there is to be a profit to the man who does the business. The city must be protected against offence, and pay very little indeed for the protection.

THE CHAIRMAN.— Success financially, you mean?

MR. MORSE.— Yes.

THE CHAIRMAN.— Mr. Coffey, of Worcester.

MR. COFFEY, of Worcester.— From the second city of the Commonwealth, Mr. Chairman, with all due respect to the Mayor; and I may say, parenthetically, that that step which he says separates Fall River from Worcester is one which will have to be taken by

some one with seven-league boots. As the Chairman knows, in 1893, at the order of the City Council of Worcester, I investigated this subject of garbage disposal, and saw in operation all the plants that were then in existence. I travelled as far south as Washington, west as far as Chicago, and north to Montreal, and saw all the plants in operation in the various cities of the country at the time, within that radius.

I do not agree with Mr. Pierce in saying that the system of cremation is a failure. On the contrary, I am very firmly of the opinion that for smaller cities the system of cremation is the best.

In the first place the product is of no value to the city, if it costs $1.50 to get a dollar's worth. The agents of these reduction systems claimed that there was 30 to 35 per cent. in the investment. That is what they would whisper in your ear; but they wanted $50,000 to establish the plant, and then the city to pay 50 to 75 cents per ton for reducing it. I confess I was not favorably impressed with it from a sanitary standpoint. The reduction system is too complicated. There is too much machinery to it. I saw a plant in operation in Washington, costing one hundred thousand or more dollars; and it was not a sanitary success, in my opinion. It was subsequently burned down, and the city refused to allow it to be rebuilt. Washington is now, I understand, putting in a system of cremation. I do know furnaces can burn this garbage without serious offence. I do not take into account the value of the ash. That is a claim made by the agents of this system; but, in my opinion, it cannot be taken into serious consideration.

The question that presents itself to the average municipality is that this system of cremation is simple. The cost at the outside to erect a plant is not more than $10,000 or $12,000; and such a plant would be large enough to burn the garbage of a city of 100,000 people, and it can be owned, operated, and managed by the city afterward, while the reduction process is always a stock company, and there is always the suspicion of stock jobbing about it.

Now, as I have said before, it is of no account to the city, if there is a value in this garbage, if it costs more to get it out than you obtain for it when it is gotten out.

We had an offer at that time, from a concern whose furnaces I

saw in operation and which are still in operation, to erect a furnace for the city of Worcester. The cost was to be $10,000, and a guarantee that the cost per ton would not exceed 45 cents. That was four years ago. Since then I have not given any particular attention to the subject; but I am informed, in a general way, that improvements have been made in the furnace, so that the cost to-day is somewhat less per ton than it was at that time. Now I do not agree with Mr. Pierce, either, that the feeding of garbage to swine is a failure. If it was so, we should probably be able to get rid of the hog power that we have in the city of Worcester. It has been in successful operation in Worcester for years, and is a financial success, leaving out the sanitary aspect of the case entirely. They have not had any epidemic among their hogs. The hogs have thriven and multiplied, and there are about 2,000 to-day eating up the garbage of Worcester.

This is my experience. As I have said repeatedly, I believe furnaces for the smaller cities are best, because you can own them outright, control them outright, and the initial cost is not large.

Mr. Brimblecom.— I do not know that I can add anything to what has been said, as Mr. Coffey voices my sentiments in the matter. I would only like to refer the Association to the reports made for the last two years to the American Public Health Association by Rudolph Hering, of New York City, in which, on both occasions, he states that the cremation process is the only one he considers worth bringing before the Association. He does not consider the reduction process as at all sanitary. It seems to me that that position is being strengthened right through,— that the reduction process is not a sanitary method, and ought not to be supported by persons engaged in sanitary work. I think those of us who visited the Buffalo works last September were thoroughly disgusted with the appearance of the works and the odor there was about the premises. I have read with interest the report of the New York State Board of Health upon that matter. A petition was brought to them by residents of the suburbs of Buffalo, and they held quite an extensive hearing. The testimony brought before them was very interesting; and the result was that they appointed an inspector, at

the expense of the company, to see that the place was kept in a sanitary condition. That is sufficient comment on the Buffalo system of disposing of garbage.

In my opinion the ideal solution of the garbage problem is to dispose of it upon the premises where it is made. It ought not to be taken away from the premises; but, if, by any combination of circumstances, it is impossible to have it disposed of upon the premises, then the city should burn it in some way. There are various ways of doing this; and the experience across the water, and in one plant here on this side of the Atlantic, shows that it can be done in a sanitary way, and at a cost not exceeding 30 cents per ton.

I trust that the matter can be practically brought to a head by having the members of this Association support a bill, which has been presented to several legislatures, prohibiting the feeding of garbage to swine. That bill, to my own knowledge, has been before the last two legislatures, and in 1896 I was the only person who appeared in favor; and I had to fight the whole city of Worcester, which came down with mayor, aldermen, and overseers of the poor, but I think the board of health was not represented.

At a hearing on the same bill at this legislature, as I had received such an overwhelming defeat in 1896, I kept quiet. I went there for information only, and found the whole city of Worcester there in opposition, as before. Mayor Quincy, of Boston, appeared to be in favor of the bill; but the committee again reported leave to withdraw. If this Association can, in some way, secure the passage of that bill, I think it would be the opening wedge to the sanitary disposition of our garbage.

Dr. Chapin, of Providence.— I do not know that I can add anything to what has been said this afternoon. It seems to me that Mr. Morse has told us what the situation is. I agree with him that I should like to see a reduction process successful, and I agree with him entirely as to what success means. I have not as yet seen any reduction plant that was successful. I hope that it will come; but, at present, I certainly cannot recommend it. We had the Simmonian system in Providence; and I know, as Mr. Pierce says, that

a ton of garbage is worth $3, but it cost us $5 to get that out, and so the works were abandoned.

THE CHAIRMAN. — There are still left a few minutes in which this paper may be discussed briefly. Does any one wish to say a word more?

MR. PIERCE. — I have a few words of reply to these gentlemen. I seem to be in a minority here to-day, and I must say that I am a little surprised for this reason. If the people of this country have a reputation for anything at all, it is for their enterprise and skill in manufacturing industries.

We have here an article, which one of my friends says is not valuable, and has nothing of value in it; and another says that it is of value, that there is value in it; but that it is obtained at $5 when it is only worth $3 per ton. Now we all know that, if garbage contains $3 worth of products, the people of this country are not going to consider it an impossibility to get those products out economically, and in such a way as that they will pay.

Now, in reply to my friend, Mr. Morse, I would say that he emphasizes the fact that the city of St. Louis paid $1.80 per ton. I expect that the gentlemen who obtained that contract thought, as most gentlemen here would think, that they would get it at as high a price as they possibly could; and I think, by some hocus pocus among the politicians, they were enabled to obtain $1.80 in St. Louis. The company who furnished that process are wealthy people; and they know the value of a dollar, and are not anxious to get contracts on which they will lose money. They succeeded in getting the highest price for treating garbage of any company. But the same company, when it came to bid for a contract in New York, offered to take the garbage for about 75 cents per ton. With all their experience in running an expensive plant at St. Louis, they did not make but $1.80; and they came to New York, and agreed to take a contract there at their offer of 75 cents. Another utilization process company did obtain that contract for about the same price, an equivalent of about 75 cents per ton.

Now, in answer to Mr. Coffey, of Worcester, I would say that I have great respect for his judgment. But here is the report of a

committee sent out from New York City by one of its mayors. That committee or commission consisted of Thomas L. James, who is our postmaster; Charles G. Wilson, president of our Board of Health; Franklin Edson; Daniel Delehanty, lieutenant United States Navy; and W. S. Andrews, commissioner of street cleaning. These gentlemen were not interested in cremation or utilization processes. They visited, at great expense, all the cities of importance in this country. They examined all the processes; and, when they returned, they reported, as I told you, about crematories, condemning them in their recommendation, which, if you will bear with me a few minutes, I will read: —

First. They recommend that dumping city refuse of any nature in the waters of the harbor or its adjacent or tributary waters should be absolutely prohibited.

By the way, they went on to show that it killed the oysters, absolutely, in water at all shallow.

Second. That the ordinance requiring householders to keep separate garbage or kitchen refuse from ashes and other house refuse should be rigidly enforced.

Third. That all house refuse should be collected in galvanized iron vessels with tight-fitted metal covers, and of such sort that, when full, it can be easily handled by one man.

Now, gentlemen, these are business men, having no system to advocate; and this is their report. They are men well known, and had a scientific expert with them, a man of great ability, whom I know well; and they examined this subject carefully.

Fourth. That daily collections of garbage should be made by the city and delivered at the dumping wharves into the temporary storage, or to self-propelling boats of an approved type, furnished by the party having a contract with the city for final disposition of the garbage.

As the plant for the reduction of the garbage of this city would necessarily be extensive and costly, a contract for a sufficient length of time should be offered by the city to warrant the investment, say not less than ten years, with proper provision for the transfer of the property by the contractor, at fair value, when the contract is terminated. Ample provision should also be made, and abundant secu-

rity required for the performance of the work on the part of the contractor in a clean, inoffensive, and sanitary manner, and removal of the garbage daily from the city to the reduction works, which should be located at a suitable point beyond the city limits.

Sixth. That a separate collection should be made of the remainder of the refuse of the city not otherwise provided for, which should be used for filling in at Ryker's Island or elsewhere, and for the transportation of this material a sufficient number of self-propelled boats of an approved type should be constructed and owned by the city.

It should, however, be provided that, whenever the whole or any considerable portion of the street sweepings can be disposed of by contract, or sold for fertilizing purposes at a price greater than their value to the city for filling, then such disposition should undoubtedly be made of them.

Seventh. That the city adopt metal, water-tight covered carts, or trucks, of a uniform pattern, for the collection of all refuse, and mechanical dust-collecting sweepers, when a satisfactory type can be obtained, and that, whenever the sweeping of the streets causes dust to arise, they shall first be sprinkled.

Eighth. That each refuse cart or truck depositing its contents should be disinfected, and washed out thoroughly, before leaving the wharf.

Now the fifth I skipped, simply because I want it to come in last; and I want you, gentlemen, to consider the importance of these recommendations.

So far as I am personally concerned, the garbage business is incidental entirely. I am not dependent upon it in any way, shape, or form. I was led to investigate it from the fact that the business I was engaged in — the importation of a very high grade of phosphate — was greatly improved by reduction processes, provided they were a success.

Fifth. That the garbage should be disposed of by a reduction process producing fertilizer and commercial grease, and that the city should invite competition by the various companies controlling such systems, in order that the greatest benefit to the city may result.

I will briefly say that I do not care a cent about the garbage busi-

ness, and I will tell you that I know, positively, that it will not be three years until every city of any size, that is not tied up by contract, will have the utilization process; and this valuable material will be returned to the farmers, where it belongs, at a price so low that there will be a revolution in the fertilizer business.

EDGAR H. GAMMONS, New Bedford.— Gentlemen, you have honored me by electing me a member of your Association. I came here feeling first-rate, and now I feel better still.

I have just finished a plant costing me about $30,000; that is, myself alone. I went about the country considerably, and examined several plants, and decided that this was the best thing I knew of, could find out, or hear anything about. I have undertaken the construction of this plant. If it is a failure, why, pity me. If it is a success, you will all know it; and I want to give you all a cordial invitation to see it. We expect to be running in about three weeks.

A MEMBER.— I should like to know the form of process.

MR. GAMMONS.— It is the Pierce reduction system. The garbage never sees daylight from the time it is taken at the house until it goes into the extractor. The next time you see it, it is in a dry form, as dry as meal. I carried some in my pocket for a month, and there is nothing offensive about it. I am satisfied that the sanitary end is all right: the financial end I have to find out. I think I shall come out whole. I do not think I am going to get a big thing for nothing; but I think I am going to satisfy the city, and believe there will be a margin on the right side.

MR. PIERCE.— It is not often that I undertake to advise a body of men, that is as intelligent as I know you are, in any matter; but what I have to say to you to-day is this: If you have any idea of contracting out your garbage or making any garbage products, go slow, and, as an old friend of mine used to say, "learn to pedal." The time is at hand when, if you have any system but a reduction system, you will be sorry for it.

THE CHAIRMAN.— There is but a short time left in which we may make remarks concerning the use of formic aldehyde and the instru-

ments by which this gas is produced or generated. Our train, I think, leaves at 5.41; and we must not forget that. I will try not to forget it.

REMARKS, "LAMP AND GENERATOR FOR THE PRODUCTION OF FORMIC ALDEHYDE."

BY DR. S. H. DURGIN.

I have received so many questions from boards of health and institutions in the last few months with regard to formaldehyde gas, but particularly with regard to the instruments by which the gas may be produced, and also requests by members of the Association to bring before you this apparatus, that I have consented to do so, and to make but very brief remarks concerning the effect of the gas itself.

I believe that experiments have long since shown that this agent is one of the most powerful germicides with which we have become acquainted. For all kinds of pathogenic bacteria the agent does its work quickly and economically, and is the first agent, within my knowledge, which can suitably take the place of the sulphur dioxide gas.

I have no doubt that every person here connected with any public service feels as I do,— glad to give up the old sulphur process when we can find a better agent.

I think we may take it for granted that this agent is an effectual germicide. The tests have shown it to our satisfaction. The only question which has been a difficult one to solve is as to the apparatus by which this agent may be made available.

There are various lamps now in the market by which wood alcohol may be dehydrogenized so as to give us formaldehyde gas liberated in the room and upon articles to be disinfected. These lamps are not all upon one line of construction; but a simple one is here before you, manufactured under the direction of Dr. Kinyoun, of Washington, a surgeon of the Marine Hospital Service.

There is another lamp on similar lines constructed under the direction of Professor Robinson, of Maine. The Kinyoun lamp con-

sists of a pan or receiver into which we place mineral wool, and upon that we pour the wood alcohol. The alcohol being ignited, we place this collar down over the lamp, and the flame from the alcohol, passing through the wire screen, immediately comes in contact with this platinized asbestos disk, which, as you see, is perforated with little holes. When this disk has become aglow by the heat, then we take this hood, pass it down over the collar, past the little ventilation holes, to extinguish the flame. Then remove the hood, and you have the lamp in operation.

The operation is by the evaporation of the alcohol up through this platinized disk; and the alcohol, coming in contact with this platinum, is deprived of a certain portion of its hydrogen, and liberates into the atmosphere the formaldehyde gas.

Theoretically, this is all right, and has in some instances worked very well; but it is surrounded with little difficulties. In my own hands, as well as in the hands of a great many others whom I have talked with, it often fails to work more than for a few minutes at a time. There was found to be a leakage of air at the bottom of this collar; and, to correct this, another pan has been added to the bottom, rising two or three inches on the side, and giving opportunity to make a water-seal over the lower edge of this collar. But, with this alteration, I am still unable to make it work well.

Practically, after the lamp is operated five or ten minutes, the process stops, and you find nearly as much alcohol as you poured into the pan. Again, if the little holes in the disk are too large or too small, the process is defeated. Unless every atom of the alcohol comes in contact with this platinum, it passes through as alcohol, and therefore gives you no formaldehyde gas. If these holes are too small, then you get too great an oxidization of your alcohol, and no formaldehyde gas.

I used these lamps in January and February; but, not succeeding with them, I began to use the Autoclave, a specimen of which I have here. In this, instead of taking the wood alcohol, we purchase the formaldehyde gas in a 40 per cent. aqueous solution; and this, mixed in equal parts with a 20 per cent. solution of calcium chloride, is placed in this copper tank, and heated with the spirit lamp underneath. Boiling, the mixture sends off the required gas. The for-

malin boils at 175 degrees Fahrenheit, while the water which is in the mixture boils only at 212 degrees. The gas is liberated by means of an automatic valve, situated at this point, under a pressure of three atmospheres.

With the lamp, when it works, you can liberate the gas from about a litre of alcohol in an hour. That is about the best that can be done, I think; and you may consider yourself fortunate if you do that. With this Autoclave, or regenerator, you use an exact amount of gas which you are sure to liberate into the room. You not only have an exact process, and know precisely what you are going to liberate into the room in a given time, but you liberate it almost twice as fast as by the lamp. You all know how important it is that you should liberate your gas as rapidly as possible on account of the many leaks in the room after you have tightened it up as well as you can.

The lamp costs about $2.50. This (the Autoclave) singly would cost $12, but on large orders may be purchased much cheaper. From the experience I have had since the first of last January, I would much prefer to purchase the Formalin Solution, and liberate the gas with this regenerator; and certainly, when you consider the effect which you are sure to produce with the one, and which you are very likely to fail to produce with the other, this process is the cheaper of the two. The formalin costs about 25 cents a pint; the wood alcohol, about 70 cents a gallon.

If there are any questions concerning the practical use of the lamp or the regenerator, so far as I have been able to gain experience, I shall be glad to answer them: otherwise, I have no further remarks to make at the present time.

I will light this lamp, so that you may see its working. This spirit lamp, for heating the mixture, would require about four ounces of wood alcohol for each two litres of the mixture. I have lighted this one, and in about ten minutes we shall find the gas being liberated here.

I forgot to tell you of an important part of this (the Autoclave), which is that a rubber tube may be used to connect the escape pipe for the gas with the interior of the room which is to be disinfected, and set your apparatus on the outside. By means of this rubber

tube, and a little copper pipe passed through the key-hole and tightened up by means of this rubber cup, you discharge the gas into the room. At the end of about thirty or forty minutes you may take away your apparatus, put a little plug of cotton in the key-hole, and go to the next house for further work.

A MEMBER.— How long do you keep the room closed?

DR. DURGIN.—For surface disinfection, a few minutes under this pressure will be sufficient to kill almost all the pathogenic germs; but, if you want penetration, you will have to keep the room closed, with a plentiful amount of this gas, for about five hours. I think for the disinfection of mattresses, folded blankets, etc., five hours have been found ample. For pillows there is not much evidence that the penetration has been effectual even after five or ten hours; but I do not believe that the centre of a pillow is likely to be infected, if the pillow has been kept intact.

A MEMBER.— What is the name of this apparatus, and where can it be obtained?

DR. DURGIN.— It is constructed by the Sanitary Construction Company of New York. The lamp I show here was constructed for us by Mr. H. I. Gregory, of Washington, D.C.

Dr. Chapin, of Providence, has had considerable experience in the study of formaldehyde gas, and considerable experience in experiments with the same and with the lamps. I will ask Dr. Chapin to inform you as to the results of his experiments.

DR. CHAPIN.— I came down here to see if I could learn how to use formic aldehyde gas in an efficient manner. I shall want to get an Autoclave, and try that, because I have not been entirely successful with Dr. Kinyoun's apparatus. Dr. Schwartz, of the State Board of Health, obtained one, and kindly loaned it to me; and I have been experimenting with that, and a couple more which I constructed, and I have found the same difficulties that Dr. Durgin has found. I have found a difficulty in getting the apparatus to work.

I have, in almost all cases, tested disinfection by exposing rods

infected with diphtheria germs; and, as a matter of fact, they are not disinfected half the time. I lay it to the fact that the machine does not work properly. It does appear to me that the other apparatus promises better, though it is possible, by altering this one somewhat, it can be made to generate the gas efficiently.

I should like to ask one or two questions. In the first place, How much formalin is used for 1,000 cubic feet?

Dr. Durgin.— The quantity, found by experiment so far with this, is something less than a litre of the mixture per thousand cubic feet.

Dr. Chapin.— I should also like to ask what precautions he (Dr. Durgin) takes about making a room tight. I often find one great difficulty. The gas is so diffusible that in an ordinary room it disappears in a very short time after it has been generated. You may generate the gas so that it is impossible to enter the room, and in a very short time it will go out through the cracks of the doors and of the windows. I should like to know the practical precautions Dr. Durgin takes to keep it in.

Dr. Durgin.— This is the most important question that could have been asked, for everything depends upon the tightening up of the room. Some rooms are quite easily closed up so as to hold the gas fairly well. Other rooms will require a great deal of work and a great deal of patience; and even then you must discharge a large amount of gas very quickly, or else you will lose the gas from the room too soon to do much penetration. We use a good deal of cotton batting crowded into the crevices. We use newspapers for the same purpose. I think one of the best things, however, is the little paper ribbon about 1½ to 2 inches wide, which may be purchased at the stores, pasted up and down the cracks. All fireplaces, of course, must be crowded full of either rags or paper. I think the little paper ribbon pasted on the window casings and the doors is, perhaps, the most effectual thing I know of.

Dr. Chapin.— Is it your practice to paste up the windows in all cases?

Dr. Durgin.— No, sir, it has not been the universal practice. It is done to some extent. The men get accustomed to closing up these cracks with cotton and paper, and, by experience, they do pretty well; yet, I think, it is not as effectual as the pasting with the paper ribbon.

Dr. Chapin.— There is one other thing that I should like to mention. Those of you who have had the misfortune to sleep in a room that has been disinfected by sulphur dioxide know how disagreeable that is, and how long it remains. Now the presence of formic aldehyde gas is not much more pleasant; but, fortunately, we can get rid of the formic aldehyde gas by evaporating a little ammonia. It is remarkable how quickly the disagreeable effects of the formic aldehyde gas can be destroyed by ammonia.

A Member, New Bedford.— I will say, Mr. Chairman, that, like Dr. Chapin, I came here to learn, and have been interested in this apparatus. The apparatus we have used is much simpler than that. It is a modified lamp procured in Indianapolis, and from that we can understand the diffusibility of the gas and the simplicity of its working. This seems to be a far more perfect apparatus, and we shall take the earliest opportunity of procuring one of these Autoclaves.

Dr. Durgin.— There is a much larger Autoclave we can use for this purpose, and which we shall be obliged to use in quarantine on large ships, in school-houses, and in other large spaces. Those will cost, probably, $150 apiece, and are manufactured by this same concern.

Those of you who would like to get a clear idea of the character of this gas can pass this way, and do so.

After some further inspection of the apparatus and its working, it was moved and seconded that the meeting adjourn.

Adjourned.

Extract from the Report of the State Board of Health on the use of Antitoxin for the year ending March 31, 1896.*

The whole number of individual reports received by the Board from all sources for the year ending March 31, 1896, was 562. It is impossible to state the exact number treated with the antitoxin furnished by the Board during the time stated. It is probably not far from 1,000.

In order to form a just estimate of the value of this agent from the experiences recorded, it will be necessary to classify the returns, and to separate those where a bacterial diagnosis was made by culture from those where no such examination was made. Of the former there were 289 returns, and of the latter there were 273.

Cases in which a Bacterial Examination was made.— It is desirable to divide this class into two groups,—those in which the diagnosis was positive and those in which it was negative. There were 262 cases in which the diagnosis was positive, as shown by cultures taken from the throat; and of this number 36 died, or 13.7 per cent. of the whole number of positive cases.

Sex.— The number of males was 125; and the deaths of these were 18, or 14.4 per cent. The number of females was 135; and the deaths of these were 17, or 12.6 per cent. The sex of two was not stated.

Ages.— By ages the numbers and the deaths were as follows: —

Age Periods.	Cases.	Deaths.	Fatality (Per Cent.).
From 0 to 2 years,	30	9	30.0
" 2 to 5 "	71	16	22.5
" 5 to 10 "	91	9	9.9
Over 10 years,	67	2	3.0
Age unknown,	3	0	0.0
Totals,	262	36	—
Mean,	—	—	13.7

Day of Illness when Antitoxin was first administered.

Fatality,	1st day,	0.	
"	2d "	9.7	
"	3d "	8.7	
"	4th "	15.4	
Fatality,	5th day,	22.2	
"	6th "	20.0	
"	7th "	33.3	

In many instances the day of administration was not stated. The foregoing table relates only to those cases in which the day of illness was noted on which the antitoxin was used.

The remainder of this report may be found in the Twenty-seventh Annual Report of the Board.

*The Report for the year ending March 31, 1897, is now in press.

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[The Association as a body is not responsible for statements or opinions of any of its members.]

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JULY QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The July quarterly meeting of the Massachusetts Association of Boards of Health was held at Gallop's Island on Thursday afternoon, July 29, the President, Dr. H. P. Walcott, in the chair. The following is a report of the proceedings: —

THE PRESIDENT.—Will the Association come to order? The Secretary will read the record of the last meeting.

THE SECRETARY.— Mr. President, there are records of two meetings to be read.

THE PRESIDENT.— Well, read the two, please.

The records of the January and April meetings were read.

THE PRESIDENT.— Is there any amendment to be made to the records read to you? If not, they will be understood to be the records of the last two meetings of the Association. In behalf of

the Executive Committee I would report to the Association the names of

A. C. Burnham . . . . . Cambridge,
F. W. Russell, M.D. . . . . Winchendon,
E. W. Young, M.D. . . . . Everett,

as candidates for membership in this Association. Is it your wish that they be elected members of this Association? If so, you will signify it by saying aye. [The vote was taken, and the President declared the above-named gentlemen elected to membership.] Is there any business incidental to the affairs of this Association which any member desires now to bring forward? If not, the report of the committee "on Rules for Protection of Milk Supplies from Pollution and for the Investigation of Cases and Epidemics of Disease supposed to result from such Pollution" will be presented by Mr. Gove.

REPORT OF THE COMMITTEE.

The committee appointed to consider and report upon "rules for protection of milk supplies from pollution and for the investigation of cases and epidemics of disease supposed to result from such pollution" have not formulated rules, and, if desired to do so, must ask for further time.

The committee prefers to present a plan which may be adopted by the local boards of health for the protection of the milk supply for the locality rather than attempt to formulate rules for carrying such plan into effect. The plan recommended is as follows: —

The object to be attained is *the greater purity of the milk supply.*

The essentials to the attainment of this object are *improvements at the source of supply and in handling the milk.*

The method to be adopted is that all local dealers in milk be licensed by the local board of health; *i.e.*, the business shall not be carried on without such license.

RULES TO BE OBSERVED IN GRANTING SUCH LICENSES.

1. No license shall be issued except on declaration by the proposed licensee of his sources of supply.

2. No license shall be issued unless all sources of supply so declared conform to a certain standard.

(*Mem.*— This standard might well be fixed by a vote of this Association.)

In order to enable each local board to ascertain whether such sources do so conform, information should be at their disposal, and this information may well be supplied by a system of State inspection of such sources, the reports of which inspection should be at the service of all local boards; and, in the absence of such system, such information may be supplied by the co-operation of local boards.

The great result which may be obtained by a system of licensing the local dealer or distributor is that, in case he fails to satisfy the local board that the milk he proposes to supply will probably be free from objectionable impurities or conditions he will be unable to carry on his business; and, if this inability arises from the shortcomings of the milk producer, he will bring pressure on the producer to make his conditions conform to those which are indicated as likely to produce cleaner and safer milk, and that, unless this be done, he will buy milk only from those whose conditions do so conform.

By the requirements the following points should be covered: —

1. *Cleanliness of stable and wholesome conditions of keeping animals.*

Among tests of cleanliness which may be applied is that of observing dirt indicated by separator slime or sediment of tube, also excess of bacteria. Cows, being sources of food, should be tended and kept with as great or greater care than horses used only for burden or pleasure. Barns should be well ventilated.

2. *Health of the animals.*

The best and most approved methods of determining the existence of tuberculosis or other disease, such methods to be determined upon by each board for itself, should be employed, and the sale and use of milk from a tuberculous or otherwise diseased cow prevented so far as practicable.

3. *Cleanliness and freedom from disease of the milkers.*

The operation of milking should be looked after with special care. Above all, the hands of the milker should be carefully washed just before he begins to milk, his own personal cleanliness being even

more important than that of the cows. No person should be retained as a milker who, or any member of whose family, is affected with typhoid fever, scarlet fever, diphtheria, or any other infectious disease.

4. *Cleanliness of milk-cans.*

Before a can is used, it should be thoroughly sterilized by the use of steam or boiling water.

5. *Prevention of pollution of source of water supply used in washing cans, etc.*

6. *The milk should, as soon as possible after it has been drawn, be filtered, placed in a clean receptacle, thoroughly chilled or cooled, and started on its way to the consumer.*

HANDLING.

Points to be covered as above: —

1. Length of time consumed in transit between source of supply and consumer.

This time should be the shortest practicable necessary to secure an adequate supply.

2. Temperature of milk in transit.

The milk while in transit should be kept ice-cold, or as nearly so as practicable.

3. Method of delivery to consumer.

The preferable method of delivery is one in which the milk is poured from the large can directly into a vessel which does not leave the consumer's house.

4. The practice of returning uncleaned cans and stoppers from the dealer to the producer is to be condemned. Before so returning them, the dealer should be required to see that they are thoroughly cleansed and sterilized by the use of steam or boiling water.

Inasmuch as milk is one of the best culture media for micro organisms, and is always liable to become infected with the organisms of disease, and, further, inasmuch as the process of Pasteurization is known to destroy such organisms, it is recommended by a majority of the committee that, as far as possible, all milk be Pasteurized before it is sold.

In the case of epidemics supposed to be due to polluted milk the

usual methods of epidemiology should be followed, so far as locating the cases, fixing the dates of attack, and seeking for a common bond are concerned. If it then appears that the milk supply may be at fault, every endeavor should be used to connect the epidemic in question with one or more cases of disease on the farm supplying the milk or among the persons handling it. It is not enough to discover cases of the disease in question among those producing or handling the milk: the dates of such case or cases must be such as to allow a reasonable probability that the epidemic is secondary to the cases discovered. If such cases are found, it is important to discover the precise connection between the person or persons affected and the milk supplied. Such connection will usually be found to consist of milking, washing pails or cans, or testing or handling the milk in milk-houses. Contact by the hands or fingers of persons diseased with milk or milk utensils, is a ready method of infection.

The President.—The next business in order is the paper, rather incorrectly stated in the programme, upon the "Milk Supply of Boston." The title should properly be "Paper upon Bacteria and Acidity of the Milk Supply of Boston," by Professor William T. Sedgwick, prepared with the assistance of Mr. H. W. Marshall; and Professor Sedgwick will kindly read it.

BACTERIA AND ACIDITY OF THE MILK SUPPLY OF BOSTON.

A FAMILIAR TALK.

BY PROFESSOR WILLIAM T. SEDGWICK.

Mr. President and Gentlemen of the Association,—When this matter came up in the shape of a paper which was read at the meeting before the last on the "Protection of Public Milk Supplies from Pollution," it was brought out at the discussion that it was very desirable, if possible, to have some tests or some methods by which it should be possible to discover from the actual condition of the milk itself

the sanitary condition of that milk. That, for example, would be of great service in treating such a problem as the control of milk from another State or from one town into another town on its journey; and I had long had in contemplation an investigation of the relation between the fermentation of the milk — the ordinary sourness and the like — as produced by bacteria and the acid actually produced, believing that, if that were worked up, it might possibly give us some such method, or at least might be an aid looking in that direction. And, accordingly, I invited one of my students who has recently graduated, who was then about making his thesis, to work under my direction upon the milk supply of Boston, studying the numbers of bacteria present, and correlating them with the development of acidity or growing old of the milk; and another was put on the question of the influence of dirt in milk upon its aging and acidity. Of course, it was firing more or less in the air, as investigation of that kind always must be. We did not know how we were coming out when we began. We only knew that the Boston milk supply, like all public milk supplies, contained a great many bacteria. We also knew that this was not the fault, as a rule, of the contractors and milkmen, but that in spite of them it does frequently sour, and that all milk necessarily sours as it grows older. In fact, it might be said that one problem, and a most serious problem, of the milk supply is to get the milk to the consumer without its souring; and the results of the investigations have been, to me at least, quite interesting.

In the first place we took careful pains to confirm the older results as to the actual pollution of the milk by bacteria. In company with a former student of mine, Mr. John L. Batchelder, in 1890 I made the first investigation that had ever been made in this country — one of the first, I think, anywhere — upon the bacterial condition of the public milk supply, and showed that, when the milk arrived in Boston, it contained on the average a million or more of bacteria per cubic centimetre, and when it got on the tables of the people, and into the groceries especially, it contained a good many more than that; in other words, that it was a fluid very rich in bacteria. Ever since that time, and also since this spring, I have had the hope that these results, if confirmed, connected with the acidity, might not only

throw some light on the possible means of detecting the actual sanitary condition of milk, but also might throw a good deal of light on the causation of cholera infantum. Cholera infantum is a reproach, of course, to sanitation. Our great cities in the summer see children mowed down by this disease, and we know very well that it is not merely the hot weather. That has been proved time and again, yet it is something that goes along with the hot weather; and I had hoped that, if we could show that milk was full of acid and rich in bacteria, it would throw great light on the causation and control of cholera infantum.

Now, without saying more of what we undertook to do, let me say what Mr. Marshall has found. In the year 1890 experiments began with the cow and with what I call, and would like to have generally called, normal milk. Normal milk is milk as its flows from the teat of a healthy cow or mammal. Such milk is, of course, warm, free, or nearly free, from bacteria, clean, and sweet. The first thing that we did, then, was to find out just how sweet it is, in order to be able to trace its souring, its progressive growing old; and for that purpose Mr. Marshall visited farms to draw milk directly from the teat of the cow into bottles carefully prepared for the purpose, and tested the acidity and the richness in bacteria. In the first place twenty samples of such normal milk drawn from different cows gave, on the average, an acidity indicated by the figures 1.66. I need not give you the chemical significance of that. It would take us too far into technicalities. I will ask you to bear in mind that figure,— that normal milk, as drawn from the cow in the neighborhood of Boston, has an acidity such that it will neutralize under certain conditions the amount of alkali represented by the figures 1.6, those being standard conditions.

You will see that normal milk is not quite sweet; that is to say, it already contains a little acid, but, as the figures especially in these analyses would show, it is very little. To go to a very extreme sour milk, I tested the milk; and it contained, on the average, 7.9, had an acidity of 7.9, as opposed to 1.6, or 16, if you choose, of normal and 79 the sour milk. Now the whole process of the aging of milk is the passage from 16 to 79 degrees of acidity, and right here I would like to mention a very interesting fact.

In 1891 a German investigator, an assistant physician at the University of Breslau, published a paper on the reaction of cow's milk and human milk, using precisely the same methods that we have used, and getting results, on the whole, very well agreeing with these, his average having been 1.9 for the normal milk, while ours was 1.6, 16 as opposed to 19. In other words, Boston milk compares with Breslau milk as 16 to 19 in acidity,—a very little bit sweeter; but we do not know exactly how he took his samples, or the numbers of cows used, or the time of year, or period of lactation. All these things have their influence. So I think it is perfectly fair to say that the results agree remarkably.

Now the further history of the souring of the milk, or its growing older, further fermentation, consists simply in passing from 16 to 79. The problem for the milkman is to keep it from so passing. The problem of the sanitarian is the same, so far as the supply of sweet and normal milk is concerned. In the case of this normal milk, to part company with that, no particular attention was paid as to whether it was the first or last part of the milking. The German investigator found that the milk was almost the same in the first and last portions, but not quite. It was a little bit more acid in the first portion than the last. The cows in those cases were mixed breeds, and were fairly clean. At the time of milking there was no bedding on the floor: the cows were quiet and peaceable. Other precautions, such as washing the hands or washing the cows, were not observed. In this case the milk passed through a two-inch sterilized funnel into a sterilized bottle.

Now milk contains bacteria under ordinary conditions, as milk is drawn by the ordinary milkman: it is seeded with bacteria. It is still an open question whether in the teat of the cow there are resident a few bacteria. It is claimed in a recent article of the bureau of animal industry that there are some such. It has been claimed by almost all investigators,— I perhaps have no right here to say it, but I personally do not believe that it is true,—all the observers who get this result got occasionally sterile samples; and I believe, if they took precautions enough, they would nearly always get sterile samples, and that, in cases where they did not get them, it would be either due to disease or to accidental introduction of bacteria from

the air. By passing a sterile catheter up into the cow, I have frequently got sterile milk from the cow. That does not, however, exclude the possibility that fore milk, as it is called, milk in the duct of the teat at the beginning of milking, may contain a few bacteria; but, personally, I believe that is very unlikely, although many investigators claim that the duct is more or less charged with bacteria. At any rate, the number is low; that is, dozens or hundreds or units even instead of thousands or millions in freshly drawn milk.

This sweet and comparatively bacteria-free milk then proceeds to grow old or ferment by virtue of these same bacteria, and the process is a gradual one under ordinary conditions: in hot weather, a rapid one; when the milk is refrigerated, a very slow one. We have been very much aided in this investigation by milk contractors and their agents. They have put at our disposal every possible facility, and we are very glad to return them our heartiest thanks for all their kindness.

Now it will be interesting to see how the milk arrives in Boston after it has started with an acidity of 16 or 1.6, if you prefer, and a very low charge of bacteria.

The average of thirty-seven samples taken from various contractors was 1.71,— that is, instead of 166 it was only 171 in acidity when it arrived in the city,— as it seems to me, a really fine showing, proving that milk when transported on the trains is very thoroughly protected *en route* from souring; and, if you will look for a moment, you may see that this must necessarily be so. The one danger that threatens the contractor or the ordinary milkman is souring of his milk, because people won't buy sour milk. They will buy dirty milk, they will buy old milk, anything except sour milk. Milk that is sour is sent back to the farmer. By the process of testing I shall describe, I would like to have the dealer or contractor determine whether it is sour or not, and, if it is sour, send it back. If the milk actually taken into the city and distributed by the great contractor was hardly richer in acidity than normal milk, if it was a little richer, as may be expected, the reason, as we know from experiments, is it is so well refrigerated, because by icing milk you can keep acidity down; but I should say you cannot keep bacteria down by ordinary icing. That is shown by these facts. While the acidity is 1.71 as

against 1.66 of normal milk, bacteria, instead of being dozens, hundreds, or units sometimes per cubic centimetre, are over seven million per cubic centimetre. In other words, those bacteria that produce the acidity are kept down by refrigeration, but a lot of bacteria that do not produce acidity were able to grow at that low temperature to the degree that milk was really aged seriously, although it was not damaged seriously by acid. From a sanitary point of view it was damaged very much, but from the chemical point of view it was not; and nothing is more natural than that might be the case, because the milk supply involves the question of getting milk to the people without its being sour. In this milkmen have done admirably in aiding us, and are entitled to our thanks for it. That, however, is milk as it arrives in the city; and, if any one could go and get that milk, it would be comparatively sweet, but it would be very high in bacteria. I should like to say that I repeated these counts on bacteria because we have more decidedly improved methods over those of seven years ago, and I was anxious to see whether my results there came within or outside the limits of error. I found that they were well within, that the numbers were really much larger than we used to find, and that by the modern methods we got a good many more bacteria. The contractor sells to the dealer: the dealers take it to their milk-house, ice it, keep it some time, and then finally deliver it; and, to go to the other extreme, probably the worst condition we shall find any milk in, in the city of Boston, is to be found in the groceries, especially in the tenement-house district, — groceries to which the people send for a cent's worth of milk. Mr. Marshall has been to the North End, Charlestown, and Cambridge, and all through the city, and has done it all through the spring; and up to the present time he has found a very unsatisfactory state of affairs in these groceries.

It may not be known to all of you, although it must be to many, that a good many cheaper stores will advertise milk below the regular rates,— "Pure milk, four cents a quart!" "Pure milk, five cents a quart!" That means they do it at a loss, in order to get people to come to their shops and buy other things. And those people, since they lose on the milk, are not very careful about it. The cans will not be very thoroughly iced. They stand upon the

counters and behind the counters, and in hot weather there might be very serious results from bacteria. Up to June 8, or, I will say, July, we had a very cool season. We have not had the usual hot weather through the spring; and it is also to be noted we have not had the usual cholera infantum so far, and the milk is particularly good this year, giving better results than we should get in the ordinary season. Up to June 8 the average of one hundred and four samples taken from these cheap groceries gave an acidity practically normal, 1.6, the numbers of bacteria hardly above ordinary, eleven millions, whereas the ordinary, when it arrived in the city, might average seven millions. That means that, with the cool weather we have had through the spring, the treatment was so good that we got nothing very bad; but now, during June, the thirty samples gave an average acidity of 1.7. It had gone up a tenth; and bacteria had gone up two millions,— nine millions. During July, when, you remember, we had some very hot weather, there was a tremendous jump in acidity, the average of seventy-nine samples giving 2.11 acidity,— a very large amount comparatively,— and the number of bacteria per cubic centimetre nineteen millions, the amount previous to June 8 having been 16 as against 21 in acidity, and twelve millions as against twenty millions, during this hot time and the rest of July to date; but to this company it means that, as the season goes on, the bacteria are increasing in those groceries, and the acidity is increasing, so that people who are buying that milk are buying sourer and more decayed, fermented milk. What it will amount to in August, if the thing continues, we do not know; but we are having a very cool season, and we are probably not going to get as high results as in the ordinary season. It will be interesting to see, too, if cholera infantum follows the same rule, as I think very likely it may.

Some tests of buttermilk were made. The average of five samples showed an acidity of 7.9. I spoke of the effects of refrigeration, and the excellent work that is done in that direction by the milkmen; but, to show that test and the effect upon acidity and upon bacteria, we got results like these. Some normal milk — that is, milk with an acidity of 1.6 — was put in the refrigerator, at a temperature of from four to sixteen degrees Centigrade; and at the

end of one hour the acidity was normal, 16. The bacteria were 475; and at the end of 288 hours in the refrigerator, or more than ten days, the acidity was only 19 as against 16. The acidity remained low, but the bacteria were ten billions per cubic centimetre. In other words, while the refrigerator is an economical device of great merit, as a sanitary device it is a very serious failure. This milk was not soured, but it was most disagreeable and rotten: it was nauseous. It had ten billions of bacteria in it; and it was milk that nobody could possibly have drunk, and yet it was not sour and was not clotted. So the refrigerator has a very valuable effect in preventing souring, but it is only a very imperfect instrument in keeping milk, from a sanitary point of view.

We have other results of the same sort. Here is one with a very low acidity, 1.1. At the end of 288 hours it was 1.8 in acidity, but the bacteria had risen from eleven thousand to eight billions. Milk like that, of course, is not at all fit to drink; and nobody could drink it as a matter of fact. It is very disagreeable, really rotten, though not sour, due to fermentation; and this we regard as quite a discovery,— that the growth of the lactic acid bacteria can be checked by refrigeration, but other bacteria, which are possibly more dangerous from the sanitary point of view are not to be so checked.

Then, in order to see what can be done by Pasteurized milk, we have examined ten samples of Pasteurized milk. The actual acidity of such milk is slight. Normal milk is 1.6: this had an acidity of 1.7. The normal number of bacteria is units, dozens, or hundreds: this had about seven thousand. That is very low indeed for any milk. It proves this: that Pasteurizing not only keeps down the acidity, but that it also keeps down bacteria. Refrigeration prevents milk from souring, but does not keep it in a strict sense. It keeps it in an economical sense, but not in a chemical or sanitary sense; while Pasteurizing keeps it in every sense.

The moral of all this, it seems to me, is as follows: we know now far more accurately than we have known before the value of a bacterial examination of milk, and that the high numbers of bacteria in that milk mean either dirt or age, — in either case highly objectionable,— and wherever there is an excess of bacteria it can be therefore

said that milk is not in the normal or even in the approximately normal condition, no matter whether the acidity is high or low. If, however, the acidity is high, that is evidence of bad refrigeration; and we found some samples of milk during the hot spell that, instead of being 1.6, gave 6 of acidity. It is well known that in a prolonged hot spell it is very difficult to supply the city with milk, because so much of it sours. It is very difficult then to carry out effective refrigeration. Therefore, while I think I cannot claim that these results have shown all that I hoped,— namely, a method which would enable us to examine milk and learn a great deal more with it directly,— both of these methods are very easy of application, the test for acidity and the test for bacteria; and I believe that the time will come when every well-regulated local board of health will have some one at its laboratory,— I mean in every city of any size, or large towns,— who shall make an examination of milk that is sold, not only in respect to the amount of water that it contains, that being probably the least damaging of all things, but in respect to dirt and its age or staleness, and that in such examination counting the numbers of bacteria and determining the acidity will be of very great value.

The President.— The report presented by the chairman of the committee and the paper read by Professor Sedgwick are now subjects for discussion or question. Dr. Chapin, you have had a good deal to do with milk in one way and another. What do you think about it?

Dr. Chapin.— I have had the pleasure of speaking with the committee that formulated this report, and what I think has already been read. The point that seems to me to be of the utmost importance is that the raising of milk to a temperature of say 160 degrees will exterminate bacterial life in that milk. We know that, when suffering from time to time from epidemics of all sorts of contagious disease, some of those epidemics are distributed through the milk supply. I think there can be no question that many of our epidemics — scarlet fever, diphtheria, and, I speak without knowledge, but I presume that measles and various other diseases which owe their existence to some form of bacterial life — are transmitted by

milk. We absolutely know from sad experience that that is true of typhoid fever, and I think some cases of diphtheritic epidemics are known to be due to milk. That certain animals may distribute tubercles from their milk I have no doubt. It appears, then, that milk is an excessively dangerous thing to drink; and, while everything that we can do to get clean milk and normal milk in the beginning is good, yet it seems to me that the heating of milk to a temperature of 160 or 165 degrees is a great deal better. I cannot state too strongly my opinion that the only safe milk to drink is milk that has been at least Pasteurized. That is all, Mr. Chairman.

Mr. Gage.— I would like to ask Professor Sedgwick if I understood him to say he found seven thousand bacteria per cubic centimetre in Pasteurized milk, or was it commercial?

Professor Sedgwick.— Commercial: it had been through the hands of several people. It was hardly giving it a fair show.

A Member.— I would like to ask what was found in the laboratory with Pasteurized milk as regards bacteria.

Professor Sedgwick.— I do not know what the number in such a case would be; but it is a hundred or two,— something like that or even fewer. I think done in the laboratory, you can get it down to dozens or units; but I mean, done on a large scale by an intelligent man, you can get it down to a hundred or two. It is well known that all germs of typhoid fever or tuberculosis are killed by proper Pasteurization; but there are some forms of bacteria, as there are some human beings, that resist more than usual. It depends very largely on the milk that is Pasteurized. If you go and buy some milk that already has millions of bacteria in it, and a lot of dirt and all that, and Pasteurize that milk, you will undoubtedly have rather a hard time. *Milk ought to be Pasteurized at the latest very soon after it is drawn from the cow, and then it would be much cleaner and better taken care of;* and, when it is treated in that way, it is almost perfect. I should like to second what Dr. Chapin has said. *I really believe the time is coming when it will be regarded as a very unusual and uncivilized thing to drink unpasteurized milk; and I think, if I had brought in some Pasteurized milk and passed it around here, and said nothing about it, nine out of ten of those present would not have known but they were drinking ordinary sweet milk,— that is*

most people, having had no sweet milk in their lives, have got used to a commercially sweet milk, and, when they get hold of sweet milk, they think something is the matter with it. But anybody who has ever squirted milk into his mouth from the teat of a cow, as all boys have done who live in the country, knows that milk that has been Pasteurized tastes like that he used to get when he was a boy,— practically, normal milk. I believe in cities especially we have got to come to that sort of thing; and I believe that, unless we do come to that, we shall see cholera infantum and epidemics of typhoid from milk. I really believe, if we could put Pasteurized milk into Boston to-day, and let nothing else go into the tenement-house districts, the number of cases of cholera infantum we should have would be too trifling to mention.

Dr. Miller.— I would like to ask the professor how high he would have to raise the temperature, in order to be sure he would destroy those germs he spoke of?

Professor Sedgwick.— That is a very difficult question to answer, for boiling does not kill all of them in all cases. As a rule, boiling will do it,— boiling for a few minutes only; but there are spores sometimes present which will withstand even considerable boiling, and one would really need to put the milk in a retort and give it superheated steam, or something of that kind, to be perfectly sure he had destroyed the last one of all.

The President. I hope Dr. Russell may be able to say something to us on this subject.

Dr. Russell.— Mr. Chairman, I count it a matter of great good fortune on my part that I am here to hear this discussion. I came down from my home this morning by special appointment to go before the Cattle Commission on this very subject, and I imagine our interview would have been very interesting. I will tell you of an experience I have had, which you probably have all had in your work, but which is new to me.

Two years ago, as the chairman of the Board of Health in my own town, I looked up the matter of the milk supply, and at once stumbled on one of the most wretched condition of things which I

believe could exist in any civilized community. The members of my board were not in sympathy with me, which sometimes happens in local boards of health. So I had to shoulder the whole responsibility and do all the work myself; and in the summer I went with the official inspector of animals, appointed, as you know, by the selectmen, who represent the State Board of Cattle Commissioners. His business was to inspect all the animals in that town,— a visual inspection. Not being an educated man, he could not make a physical examination. He also had to inspect the condition of the barns, the size of the rooms, the water supply, whether hogs were kept in the same barn, etc. The first place I went to or the second we found the man kept his milk in a little room six or eight feet wide, and had a well underneath where the water stood six feet deep, close to which there were half a dozen hogs,— as filthy a place as could be imagined. In this room were harnesses, blankets, bags of phosphate, and other things, besides some old rubber boots.

The next place I went to the man had a new barn, quite clean; but he said he had had to give up the water from a certain well, it had become so bad he could not use it any longer. I said, "You have continued to use that until quite recently?" "Yes, until within a very few days." The water was positively rotten.

The third place was a farmer's barn. When we entered this barn, we were completely upset. The odor was simply horrible, and we spent fifteen or twenty minutes trying to find out what the odor came from. We found three cows in this barn and four or five hogs on the same floor, without any possibility of drainage; and there was something else — we could not find out what it was — that made the most infernal odor I think I ever knew.

The fourth place I went to there were seventeen cows. The place had not been cleaned, the same condition underneath, a damp cellar. There were lots of rotten pumpkins in the same room with the cows, and cobwebs hanging down two feet long, and about everything as unsatisfactory as it could possibly be. I then went to the farmer's own house, and asked him to show me the milk-room. This was as dirty a place as you can imagine. There were piles of food on platters and sour milk in wide-open pans and articles of clothing in this room; and the place where the mother of the family was washing

the pans and cans was the ordinary sink, in which was piled up, I think, the accumulated dishes of at least two or three days, which had not been touched.

I went to another place, after this, and found the same condition so far as the barn was concerned. I went into the house, and asked where they took care of the milk. They said it was a very nice milk-room, where they kept the milk with great care. I asked if I might see it. He hesitated a moment, and consequently I pushed in; and here in this milk-room were particles of food, part of an old ham, a tub of old clothes, and on the top was the monthly wash of the females of the family. That is a fact, gentlemen. It does not seem possible.

After I finished this investigation, I began to correspond with the Board of Cattle Commissioners, and not to my satisfaction, however. I then went to work to see what I could do about the matter. I found that my board would not join with me, but I was determined that some of these animals which I had seen and knew to be diseased should be killed. I had one killed from a herd of six. I was at the *post mortem* myself. That cow was driven in; and, although I have no knowledge of cows, of course, in a practical way, I saw at once it was diseased. Milk had been sold in my village all that summer from that cow. As soon as it was killed and the lungs removed, I made an incision with a knife, and held the lung up like this, and pus ran out of that lung by the spoonful. I had two others killed, and they were found to be riddled with tubercles from head to foot.

Some of these statements I made known, in order that I might wake up public sentiment. One milkman said he had just as lief drink milk from a cow that showed this diseased condition as from any other cows. The tubercles were not found in the milk, therefore the milk was just as good as ever. I woke up a lot of public sentiment on the matter, and then began on the regulation of the milkmen themselves. My board would not aid me, and I thought I would stop for a while; but I very quietly got myself appointed milk inspector,— an unusual position for a man to take that had my work to do, but I was bound to see the thing through. I went to work, and of course was the recipient of all the curses that can be imag-

ined. All the milkmen in the town got after me, and there were not words enough in the dictionary to give a statement of their ideas of my conduct, the money I had, the clothes I wore, and everything else; but I stuck to it, and I refused to give any man a license who did not conform to the regulations.

I might mention here, however, that in that first paper the recommendation of the committee was made that boards of health license the milk inspector. As I understand it, now, in the country towns at least, they cannot do that. The license must be given by the milk inspector. He is appointed by the selectmen. There may be one or more. He then appoints a series of collectors, one or more, subject to the approval of the selectmen. Well, I got myself appointed as inspector, and went to work with one person. I told him what I wanted done and why I wanted it done. We went to a certain barn, and had it thoroughly swept with a coarse broom. That got the cobwebs, lice, etc., out of the way. Then I had the stalls washed with hot water, with one per cent. of corrosive sublimate solution wherever the animals could reach with their tongues, the sides of the stalls, and front of the place in which the animals stood. Then I had the whole whitewashed thoroughly. This was in accordance with a State regulation put out by the Board of Cattle Commissioners, but not insisted on only under circumstances of this nature wherever they find an animal which is diseased with tuberculosis and condemned. Then they will not pay the man for his cow unless he has done this. I went still further, law or no law in this case, and insisted that I would not grant a license to any man who did not put his barn in this condition. Now I have licensed about fifty men in my town; and they have carried out these recommendations very thoroughly indeed, and only two refused to do so. One of these was an elderly man, quite broken, and the other quite eccentric; and these two men positively for the last three months have stood on the street corner three or four hours a day damning me.

Now the issue is between them and me as to these last two licenses, and I may get beaten. I cannot tell how that will be. One of these gentlemen has the dirtiest of barns. It has never been cleaned. The man himself wears a suit of clothes that has not been changed probably for ten years. The second man I mentioned has

the dirtiest barn I ever saw. It has not been cleaned out for twenty years. The hens have their dust piles, in which they shake themselves to get the lice out, in the place where the cows are.

Now, gentlemen, you who have not been through an experience of this kind have no conception of the dirtiness and filthiness of that barn. Last week I cleaned the barn of a poor man in whom I take a great interest, who cannot work, and who has the worst of all afflictions in his family. I went up myself to his barn, and where the cattle stood there were millions of live lice. You could not put your hand on any part of that stable where you could not cover thousands of them. The man that did the work was so disgusted he wanted to give up the job. Said he, "I never thought such a thing could exist"; but by persuasion I got him to finish the work. I tell this, so that others who have not had this experience can look around, and see what they have got in their own towns. I do not think it is possible to have a decent supply of milk unless you have honest and honorable milkmen.

THE PRESIDENT.— I will call upon Dr. Davenport.

DR. DAVENPORT.— The paper which has been read upon this subject has been interesting to me. I have had some little experience for the last fifteen years in the examination of milk, having been milk inspector of the city of Boston and chairman of the Board of Health in one of the suburban towns. The recommendations of the committee are most excellent and very desirable, but I think the gentleman who starts in to carry them out in the city of Boston will have his hands full for some while. I wonder if the committee have any idea what would be the expense of carrying them out. The present appropriation of the city of Boston for milk inspection is some $12,000, I believe; and in regard to the licensing of milkmen I do not think the inspector has any authority to discriminate between whom he shall give a license to. I think the statute, as I remember it, says he shall license whoever apply; but, if he is on the Board of Health, he has ample authority to complain of a milkman as a nuisance. He can cover it in that manner.

In regard to the regulations of the Cattle Commissioners about

using corrosive sublimate upon the walls of barns and then using whitewash, I do not exactly see the object of that contention. One would tend to destroy the effect of the other, and the other is not chemically economical.

Dr. Russell.— They require the corrosive sublimate to be washed off before the whitewash is put on.

Mr. Davenport.— Many of the recommendations of the committee are such as would have been carried out if we had been able to learn how to do it. There were many practical difficulties.

The President.— The Association, fortunately, has as its guest this afternoon Mr. Burns, of the Boston Dairy Company; and I hope we may hear something from him.

Mr. Robert Burns.— Mr. President and gentlemen, I have thought this subject over, and our company has given it some attention. Last summer we sent what we considered an extremely experienced man to visit our dairies. He was a man whom we thought competent to talk to the farmers, and tell them how they should take care of their milk and everything in that line. This year, some ten weeks ago, we started him out again on a different plan. We wanted him to go to different farms, and inspect the place and make a report; and we furnished him with the means to make a report of the conditions of each dairy. That is, he made a note of the number of cows a certain man kept, the breed as near as he could, and the kind of water, whether well water, running water, or a windmill. Now he has found this year a great improvement over last year. In fact, we have some twelve or fifteen hundred dairies; and he has found that the large majority of these dairies keep their places as cleanly as can be under existing circumstances. Of course, in a good many places the farmers milk their cows, and strain into cans directly behind the cows; but the majority of them do not do that. He has discovered some very crooked places. It seems to me it would be a good thing, if it could be done, to have a law passed, so that the boards of health of the different towns could inspect the farms, and prohibit the sale of milk from those farms, if the conditions were not satisfactory.

Now one particular case. This man, going to a certain town, before he got to this farm, people said to him, "I wonder what you are going to do when you get to so and so's place?" Well, when he got there, he found,— what? This man's barn was filled with apples from last fall. Of course, they had all rotted; and the juice was running all over the floor. The cows were being fed on those apples. Of course, such cases are exceptional. We find very few of them in that condition. Of course there can be improvements; and it seems best, as I say, that a law should be passed, so that inspection by the boards of health may do a great deal of good. We have a law, you know, on the statute books concerning brewers, dealers, and contractors; but that is inoperative, and does not amount to anything. If a law could be passed that gave power to the board of health to prohibit these things, then I think the trouble would be minimized to a certain extent.

Now as to sour milk. Professor Sedgwick says this has been a very good season. It has been a majority of months; but, as a matter of fact, during this hot spell there was more sour milk in Boston proportionally than was ever know before. Perhaps the idea was given to you that the milk soured on board the cars coming to Boston, but, as a matter of fact, probably ninety per cent. of that milk was sour before it was ever set on board the cars; but the time of receiving it is so limited that it has to be put on board the cars, and brought to Boston. I know one of our men who tasted three hundred cans of milk to get one hundred, during this hot spell. That milk came from Connecticut Valley, as fine a farming neighborhood as there is in New England; and the milk of one of these particular dairies was soured every day. That particular farm probably is as fine a place as there is in New England. The cows are a fine breed of Jerseys. The conditions are as perfect as under the present system they can be. The man has ice, nice water, everything as clean as possible; but there was not a day that that milk came to Boston it was not sour when it was set on board the cars. We sent our inspector to this place immediately. The farmer's wife said that she did hope her husband would find some other place to dispose of his milk instead of sending it to the milk car. The milk was found to be sweet at the farm, but sour when it reached the car in the morning.

Now, personally, I do not think that it is much trouble tasting sour milk. The worst trouble we have is with what we call rotten milk. Its taste or smell, too, is simply awful. A man can taste sour milk all day, it won't affect him at all; but just one whiff of that milk would affect the whole business. Now that kind of milk, as far as sweetness is concerned, is perfectly sweet, and probably would keep. I do not know any reason why it should not keep as long as milk that has no odor whatever. Now, of course, the argument here is to do away the conditions that generate bacteria. Of course, farmers set their milk in troughs to cool, and leave their bungs out. I do not see any way now to take care of milk under those conditions without leaving the bungs out. As a matter of fact, milk will not taste properly if it is stoppled up before cooled; and, if it is left open, of course bacteria will generate in there right straight along, and you cannot help it; but that is the way milk has to be put up to come into Boston properly.

Now the samples that Professor Sedgwick has compared may not be samples of the very best dairies. I cannot say. I gave him one sample of a very fine dairy, I know; and I doubt if he has got samples of the very best dairies. We have customers that have practically never returned us a can of sour milk. This year I know one has not returned us a can of sour milk: that milk is put up properly; but there are other dairies where we have had to run two extra carloads of milk to make up for their sour milk.

The report of the committee said something about washing cans and sending them back to the farmers. Well, we have been all through that; and I think we got conditions that proved that that, from a health point of view, was the worst possible thing that could be done,— not only upon health, but from a financial point of view. The financial part of it is that milk has a preservative effect upon the can. A can will last for years simply with milk in it, whereas with water in it it will rust out in a few months. We have always considered that. In fact, we would not buy of farmers or dealers of that description, who rinse their cans in cold water and return them to us. They may stand a day or two a certain amount of water left in there, but that is going to rust the cans. That is a good deal worse than sour milk, to our minds.

Now, as for washing the cans clean and sending them back to the farmer, of course, perhaps the majority of the gentlemen present would take these cans as they came back clean, wash them out thoroughly, and let them air out; but I am very much afraid the large majority of farmers would never stop for that or never would rinse those cans out before they put milk in them, and cans in that condition, stoppled up in the hot season, present what is perhaps the worst condition possible.

Now as to sterilizing the cans with steam. I do not know just exactly what you mean by that,— whether you wash the cans first and then sterilize them or wash them and boil them right out with steam. But I can give you a few facts on that subject. We in our factory have a large pump, fitted up with a four to six inch pipe, which is used for raising milk from the lower story to a higher one. We commenced by cleaning the pump with boiling hot water. After a short while we found there was a very offensive odor coming from them, and we discovered that the sour milk would cake on the inner lining of the pipe and inside the pump; and that, of course, was the source of the odor. Now we have built a tank, and we pump cold water through the pipes, then rinse them through with a solution of sal-soda and boiling hot water; and we find there everything is clean and sweet as far as smell is concerned, and as far as we know, of course, it is all right. We use up our surplus milk by making cheese of it after it goes through the pump.

The worst trouble is sour milk. There is no doubt about that. The ordinary milk supply of Boston, the ordinary amount that is brought in, would be perfectly sufficient to supply Boston if there was no sour milk. There is no possible need of a single can of sour milk coming into the city of Boston, if proper care is taken. We have an extra car come to Boston in a hot period from our cheese factories in Vermont, and there is practically no sour milk; and, if one can do it, there is no reason why others cannot do it. Of course, farmers say they are short of cans, and have to wash them and fill them immediately with milk. That is true; but that is a condition that no contractor ever solved yet, and certainly cannot solve with the ordinary can used to-day. Possibly, if a forty-quart jug was used, we could solve that question; but contractors all know

that something ought to be done, and are willing to co-operate with the authorities whenever occasion requires, but it involves an enormous expense.

THE PRESIDENT.— Mr. Jordan, of Boston, has had a very useful experience in this matter. Possibly he will say something to us on the subject.

MR. JORDAN.— Mr. Chairman and gentlemen, I do not know that I can add anything to what has been said. I was very glad to hear the report of the committee to-day, that they had not suggested the adoption of any rules. I think that is a good idea, because I think this subject will bear a good deal more discussion before any rules are adopted. I think we can afford to wait, and that it will be a good idea to adopt the report of the committee merely as a progressive report, and refer the matter back to the same committee to see if they cannot add something more to their report at the next meeting.

As far as large dairies in Boston are concerned, for the last two or three years I have had occasion to visit them very frequently; and I can say that the majority of those dairies have been very good in adopting any suggestion the board made to them, and trying to do everything they possibly can. There has almost been a complete revolution in such dairies in the last three or four years. I have in mind now a dairy which is undergoing a complete revolution in the manner of conducting business. And, in regard to Professor Sedgwick's remarks about the grocery stores down at the North End, I think that it is a very good idea of his in making that report, and making those inspections in those places. That is a condition of affairs which we are very frequently called upon to interfere with. Down in the crowded part of the city they do not have any idea at all what the conditions should be. We very frequently have to inspect those places, and call them to account for the manner in which they carry on their milk business. Very seldom we find the cans washed at all. They are left around the floor in a filthy condition, and very frequently we have called their attention to the condition. At the present time, but more especially this year, the board has closed up quite a number of cow stables in Boston, the conditions

not being at all fit to carry on the milk business. There have been quite a number of places closed entirely. In other cases the owners have agreed to written conditions, to make certain changes before going on trial again in the fall. I think, if this discussion is carried on further, extended to the next meeting, it will prove to be of great benefit.

THE PRESIDENT.— Hasn't Cambridge something to add to this discussion, Dr. Farnham?

DR. EDWIN FARNHAM.— Mr. President, Cambridge last fall had an outbreak of typhoid fever that was due to the polluted milk supply of one milkman. The Cambridge Board of Health thought they would send around some inquiries to the different towns from which milk was obtained, to see if they could find out what the conditions were of the farms, or their barns, and other places where the cows and milk were kept,— not with the idea that they could do anything themselves, but possibly to help along by finding out just what these conditions were. The large milk companies and contractors very willingly supplied me with the names of the places from which they obtained their supply; and the board then sent round this circular, which I will read to the Association. This was Feb. 2, 1897.

CITY OF CAMBRIDGE, OFFICE OF THE BOARD OF HEALTH.
CITY HALL, Feb. 2, 1897.

TO THE BOARD OF HEALTH:

We have adopted and are enforcing in Cambridge certain regulations regarding cow stables, a copy of which regulations is for your information herewith enclosed.

The object of these regulations is to insure that the cows from which the milk supply of our city is in part derived are kept under wholesome and sanitary conditions.

We are desirous of ascertaining how far this is the case with those cows not kept within the city of Cambridge whose milk is, however, brought for sale therein; and we ask that you will kindly aid us in this investigation by furnishing us with the information respecting the farm of ——— in your town which is sought by the questions printed on the next sheet, that farm being one of those from which milk is brought for sale in this city, and, if your investigation of this farm discloses conditions which should be changed, we ask your assistance in bringing about an improved state of affairs.

Believing that through the co-operation of local boards of health much sickness, of which milk may easily become the vehicle of transmission, may be prevented, and thanking you for such aid as you can afford us in this matter, we are, Very truly yours,

E. Edwin Spencer,
Edmund M. Parker,
Charles Harris,
Board of Health of the City of Cambridge.

To the Board of Health, City of Cambridge:

In response to your circular letter of Feb. 2, 1897, we send the following information respecting the farm of ——— on ——— Street in this town:—

1. How is the privy vault constructed? *Answer:*
2. How far is the privy vault from the well? *Answer:*
3. Is the drainage of the ground from the privy vault toward the well or away from it? *Answer:*
4. How is the well constructed? (If no well, state how water is supplied.) *Answer:*
5. Is the well protected from surface pollution? and, if yes, how? *Answer:*
6. How many cows are kept in the cow stable or barn? *Answer:*
7. What other animals are kept therein with the cows? *Answer:*
8. What is the cubic contents of that part of the stable or barn where the cows are kept? *Answer:*

   Is there a privy in this stable or barn? *Answer:*
9. How is the cow stable or barn drained? *Answer:*

   How ventilated? *Answer:*

   How lighted? *Answer:*
10. What is the condition of the cow stable or barn respecting cleanliness? *Answer:*
11. Have the cows been tested with tuberculin? and, if not, what veterinary examination has been made of them, and when? *Answer:*
12. What changes, if any, should be made in the premises to put them in wholesome and sanitary condition? *Answer:*
13. Is the foregoing information furnished from personal inspection of the premises by some member of the Board of Health? If not, by whom is information furnished, and from what inspection? *Answer:*

(Signed) ——— *of the Board of Health of* ———.

I sent one of these to nearly every town in the State of Massachusetts where I knew that milk was obtained which came to Cambridge for sale. Of course, the answers were of various descriptions. Nearly every one answered: there were very few exceptions. One

man said "it would be too much trouble: we have just been all over it with the Cattle Commissioners"; and he sent me their blank, which, I must say, did not give us the information we wanted. Another man wanted to know how much we would pay him for doing it. Still, a large number of answers were received. I have selected a few showing what I thought the needs were.

The chief ones seemed to be these. In the first place, very few barns have any drainage, as far as I could make out from the replies. They seemed to let urine and everything else soak into the cellar. That is almost the universal condition to-day,— to let it run down and soak away somewhere in the ground. The privy vault in a very large number of cases was quite close to the well.

In a number of cases it was simply a hole in the ground, and in some few cases there appeared to be no privy vault at all. I do not know what occurred there. The well in a certain number of cases needed to be protected more than it was; that is, there was no protection at all. It was level with the ground, quite near in a large number of cases to a manure pile. In some cases there was no ventilation: in other cases it was manifestly inadequate. The air space, to which one question referred, was quite often deficient. The stable barn was built probably for a certain number of cows, and the person who built it may have had some idea of how much air was needed; but many more cows had been put in than was at first intended. As to cleanliness, of course, I had to take the report just as it came to me from the persons who made it, not knowing what their idea of cleanliness was: that is a very variable factor; but quite a number mentioned that the stables might possibly be improved if they were kept a little cleaner.

I have not sent any outside the State. It was quite an expense getting these printed, and the board simply went into this for a feeler to see what could be done; but it showed, I think, pretty conclusively this,— that a great deal needed to be done. I do not know why the local board of health should not be able to regulate these various things. We drew up a list of regulations, compliance with which is required by the Cambridge Board of Health before it licenses keeping cows in the city. I will read these regulations.

REGULATIONS REGARDING COW STABLES.

1. Every building used as a stable for cows shall contain at least one thousand cubic feet of air space for each animal kept therein.

2. The lighting and ventilation, and the condition of the roof and floor, shall be satisfactory to the Board of Health, and shall be so maintained. There shall be a sufficient supply of pure water, and such other means for maintaining the health of the animals in said stable as the Board of Health may deem necessary.

3. The stable shall be drained in a manner satisfactory to this board, and, wherever practicable, shall be connected with the public sewer by a good and sufficient particular drain.

4. The manure shall be kept in a pit constructed of brick laid in cement, with a concrete floor at least three inches thick, and ventilated as required by the Board of Health; and no more than one cord of manure shall be allowed to accumulate.

5. The animals shall be examined by a veterinarian approved by the Board of Health, whenever directed by the board.

6. The premises shall at all times be kept in a condition satisfactory to the Board of Health.

The foregoing is a true copy from the records of the Board of Health of the regulations adopted at the meeting of said board, held the twenty-sixth day of October, in the year eighteen hundred and ninety-four.

Attest: JAMES B. SOPER,

Clerk of Board of Health of the City of Cambridge.

CAMBRIDGE, Nov. 3, 1894.

We have had no trouble so far in enforcing these regulations, and I think the cow stables in Cambridge have improved very markedly.

If the city of Cambridge can make those regulations and enforce them, I presume any other city or town in the State of Massachusetts can do the same thing and protect its own interests.

THE PRESIDENT.— Dr. Durgin, shall we hear from you?

DR. SAMUEL H. DURGIN.— It seems to me the report of the committee has given us a great deal of light on this subject, and will be of the greatest use hereafter in formulating rules and in making regulations to control our milk supply. There is one part of this report which refers to sterilization which seems to me of very great importance; and while we are not yet ready to deal with the farmer until these regulations shall have been formed, and while we cannot

prevent the milk reaching us in this poor state, there is one thing which we might advise the people to do, and that is by sending out little circulars to mothers, who may fairly well sterilize this milk before using it, especially for babies. The Boston Board of Health has issued a little circular of this sort, in which it tells the mother how she may sterilize the milk by placing it in bottles and boiling it for twenty minutes, giving specifically what may be done. It seems to me that this has some value immediately to families.

Dr. J. A. Gage.— Mr. President, in reply to what Dr. Durgin has just said I will say this: That, when I have had to answer the question that a mother has asked me, what she could do to be sure that her child was getting proper milk, I formerly advised her to boil the milk, as he has suggested, and sterilize it. But it has been my observation, and I find others have made a similar observation, that children do not always thrive well on milk that has been heated to a high temperature, 212° F.; and Pasteurized milk, I find, is not always easily obtained by uneducated people. One of my professional brethren asked me to advise him in regard to a baby he had. He had lost two children. I urged upon him to be very careful and Pasteurize the milk, went into details with him. It was some time before his wife could be persuaded to carry out all the details of Pasteurization, but, once she had learned the method, she was satisfied; but that was an intelligent family, whereas among the poorer classes it is very difficult to obtain those results. I do not like milk which has been heated to a high temperature.

Formerly I was a member of the Board of Health of Lowell. We got our milk very largely from farms immediately surrounding the city. Some of them were in New Hampshire. There is no inspection of those farms, and I know that recently a great many of them are in a very poor condition. There has been some tuberculosis with us, as the slaughter at Dracut has testified. That town supplied milk to the city of Lowell, and I know from my own personal observation and experience it is a very fruitful source of danger to us there. A recent case may illustrate. A man, who had been out of work on account of illness, thought before he went back to his regular work he would go out on a farm and get strong. I had had the man

under observation some time, and there was no indication of tuberculosis; but after being on the farm awhile, and drinking two or three quarts of milk a day, he came home, and I found tuberculosis. The cow was killed. The man who lives on that farm is a fairly intelligent farmer; and, if he knew positively, and was convinced that he was feeding his family on tuberculous milk, he would not do it. I do not think he is convinced thoroughly.

This case bears upon one point I wanted to make with reference to the whole question of milk supply. I do not know that there is anything in the report in relation to giving these milk producers information. I knew one place where a man was starting in the milk business, and the first thing he did was to start a well in the barn yard. That was due to ignorance. I certainly feel we ought to have some inspection. I myself am afraid to drink milk without knowing the source from which it comes; and, when I go among my poor families, I hardly know how to tell them to Pasteurize their milk, feeling sure they will get the best results. We want to get the source pure, and as fresh as we can, and get it as soon as we can from the supply into the hands of the consumer; and it seems to me, while restrictive laws are very necessary, and I thoroughly agree with the suggestions of the committee, that something might be done tentatively in the way of education, certain suggestions as to measures that they could take without great expense, which, I think, would help the matter.

Dr. Miller.— It seems to me something might be done in this direction. I think the majority of milk producers would like to do just about the best thing if they knew what to do. Certainly, they would if it was made clear to them that it would be a financial benefit. Now it seems to me, if the State Board of Health, or some authority would send a circular free to anybody in the State that produces milk, giving them directions how to care for their cows and cans and the like of that, that we might in this way educate farmers and milk producers, so that they would give us a better quality of milk; and these gentlemen who deal in Boston, to a very large extent, could give their milk producers to understand that their milk would be more likely to be received if they conformed to certain

rules. Now I have paid some little attention to this subject, and I am inclined to think that the fault is due to the kind of can in which the milk is conveyed from the producer to the dealer in the city. I have tried this experiment, taking milk from some milkman and letting him bring it to the house in his can, and then furnishing a can of my own and telling him to fill that can instead of leaving it in his; and I find that milk would keep a great deal better, when I furnished the can, than it would if the milkman brought it in his own can. I always cleanse the can with boiling water thoroughly, and then I find the milk will keep a great deal better. I am inclined to think the great fault is in the condition of the can in which the milk is conveyed; and I think, if the proper information could be given to the dealers in the Connecticut Valley, so that they would see their milk would be more likely to be received if the farmers could be educated on that subject, they would do better, because you can touch every farmer through his pocket, surely. And, if you can make him believe his milk will have a larger sale and will bring him a better price if he will do so and so, he will be more likely to do it. And say to these dealers, "We will give you something more for your milk if you do so and so: we will pay you more for your milk." I think in that way the farmers might be educated, through their heads and pockets, so that we can get a better quality of milk.

Mr. Burns.— In regard to this circular business, telling the farmers how to care for their milk, I will say we sent our man right there to inspect everything. He has gone right into the kitchen, and inspected everything on the premises, and told them how to do it; and, if that is not telling them how to do it, I do not know how we can do any better. We ought to have a law that we could make some complaint to the local board of health that we do not think the conditions are right in a certain place, and then it could send an inspector there without bringing us into it, and tell them the place was not right. Inspect it again; and, if they do not attend to it, take them into court, and prohibit their selling milk. I think that would be a great improvement. In some places, in the city of Boston, people put rotten eggs and cheese and things of that kind in cans. Where a man has a customer taking two hundred cans a day, he cannot say, "You

must stop putting that stuff into my cans." We ought to have authority in the city of Boston to send an inspector to such places, and prohibit it; and, if it is not stopped then, bring the man into court. Then I think cans would be in better condition than they are now. The bad condition is due to rotten eggs, molasses, and that kind of things being put in the cans. We ought to be able to prevent that.

There is another matter I will speak of; that is, this cheap selling of milk in the North End,— selling for four cents a quart. In fact, that was rather a high price. I think milk was sold there for two cents a quart. As near as we could find out, the method was this: In the morning they would sell milk of good standard quality; and, when the collector of samples came round to these stores, they would get that milk. The minute they went out they would take skim milk, and sell to these ignorant people. It cannot be sold to a nice family; but it is sold to these ignorant people. I am happy to say that they do come into court, and pay a fine sometimes.

Dr. Miller.— I did not intend to find any fault with the dealer. I would have this circular issued by the State Board of Health, or some authority backed up by the power of the State; and then it perhaps might be made easier for some member of local boards in each town, so appointed, to look into the matter. If he was backed up by the State, it would be universal over the whole State.

Mr. Burr.— Mr. President, I have been much interested in Dr. Farnham's remarks in regard to the condition of the farms in New England from which his milk comes; that is, of the farms from which he obtains milk. It seems to me it would be a good plan in this State if every board of health could have a record of each farm from which milk comes, whether it is in the State or out of the State. In that way we might have registered farms; and we might make regulations that these barns should conform to, and refuse to grant permits unless the barns did conform to the regulations. For instance, I think the storing manure in the barn cellar has come to be quite an objectionable feature; and the method of handling milk, after it has been drawn from the cow, needs attention. Now in a

good many farms the milk is handled directly in the same barn. It seems to me that is quite an objectionable feature, and, as the committee reported, that milk ought to be handled outside of the barn, and also outside of the dwelling-house, and also that the milk-cans, if washed upon the farm, should not be washed in the kitchen of the house. So much for that.

Now I am a little interested in the method of the transportation of milk. I do not know whether that has been touched on or not. It seems to me that the milk supply has got to be improved from all points, not only its production, but its transportation and handling also. The Board of Health of Boston sent out a few questions to the different dairies or contractors in the city of Boston, delivering milk in the city of Boston; and among them were questions asking the maximum time that it took the cars to come from the country milk-station, the minimum time and the average time. I do not think, with but one exception, the maximum time was given over three and one-half hours. Now I know we have some milk contractors here to-day who perhaps can correct me in what I say. I was interested the other day in a reply that came from a farmer in New Hampshire, in which he reported the route of a certain car. That car left Claremont (I will give the towns: perhaps I may be corrected in it), we will say, on Monday morning, containing Sunday night's and Monday morning's milk. It went through Claremont to Bradford, arrived there some time Tuesday morning, and took on Monday night's milk and Tuesday morning's milk. It went from Bradford to Hillsboro, N.H., and arrived some time during Wednesday, and took on Tuesday night's milk and Wednesday morning's milk, arriving in Boston on Wednesday about ten o'clock. Now that car contained Sunday night's milk, Monday morning's, Tuesday's and Wednesday morning's milk. It seems to me that is quite a serious condition; and, if that is the case, certainly the transportation should be improved. While that car was iced, as all cars are, considerable milk is stored on the floor of the car; or I might say, further, that milk which arrived here, we will say, on Monday or Tuesday, was put into the closet for these cars, which are probably iced; and, as the milk came on later, it was stored on the floors and about the doors. The ice stays in among the mass; and, as the cans come along, different layers

were made. So a great deal of that milk, it seems to me, was not probably iced. I have no great doubt but all those cans put in the closet were properly iced. It seems to me that transportation could be considerably improved, as well as all other sides of the question.

Mr. Davenport.— Mr. Chairman, the improvement of the milk supply of the city of Boston, when it comes to the hands of the consumer, has shown the advantage of having the appointment of the milk inspector under the charge of the board of health, as it has now come to be in the city of Boston. It is also so in the case of the city of Lynn, but I think those are the only two cities in the State where the inspector is appointed by the local board of health. In the case of Cambridge he is, I think, appointed by the mayor; but the inspector, as a health officer, ought to be really under the appointment of the board of health. An attempt some years ago was made to accomplish that for the State at large, but it was defeated. It would be a great improvement, and I think, if this Association should make a concerted effort, it could be brought about; for, certainly, it should be considered as a health matter, and not, as it generally is, an appointment made simply for political purposes.

Dr. Farnham.— I would say the list of regulations drawn up by the city of Cambridge required cow stables to be kept in a condition satisfactory to the Cambridge Board of Health. There was one dealer in Cambridge last year who kept his cow stable in a very unsatisfactory condition. I wrote to him about the matter several times without effect; and, when he applied for a license this year, he was given leave to withdraw. He applied successively for three weeks, and each time was given leave to withdraw. He was then prosecuted for keeping cows without a license obtained from the Board of Health. That case is now in court. When it is decided, we shall know just what we are able to do with cow stables in Cambridge.

The President.— It seems to me there is a sufficiently contented expression on the faces of gentlemen here,— an expression which certainly ought to be there. It is that expression which

shows the successful digestion of an exceedingly good dinner, and I am therefore going to introduce another subject, which should be in harmony with such an occasion; and that is reminding you that Dr. Field is anxious to take a dollar and a half, the annual assessment, out of every member here who has not already paid it. Mr. Gove, have you anything to add in closing this discussion?

Mr. Gove.— I think, Mr. Chairman, instead of my saying anything at the present time, it will be much better to have the discussion closed by Professor Sedgwick.

Professor Sedgwick.— Mr. Chairman and gentlemen, I think there has been a very full discussion. I have been particularly gratified to see the breadth of the discussion. It won't do to narrow the question of polluted milk down to a question of tuberculine or anything of that kind. It is the whole question of getting more normal milk in the city; that is, the question of cleanliness in the barn, cleanliness on the part of the milkmen, cleanliness and rapidity of transportation, and care of the milk after it arrives. It seems to me those various points have been touched upon, and a good deal of valuable matter has been elicited. The only way to bring about improvement in this matter is the old one of keeping everlastingly at it; and it is very encouraging to have these statements that some of the inspectors have made, that there has been a very decided improvement. For instance, in the speed of transportation I think the idea of education is a very important one. I think that wherever the farmer is given to understand what it means to have sour milk, why it is a bad thing to squirt milk on his hands when he sits down to milk and lets the drippings run into the pail, why it is a good thing to wash the hands, and that it is a good thing to wash the hands even before sitting down to milk,— if a campaign of education in that direction can be had, the better it will be for the whole city. Personally, I feel very much gratified at the interest that has been expressed, and I believe we have now reached this conclusion: first, that at present the milk supply is not satisfactory; second, that it can be made much better; third, that, in order that it shall be made much better, the farmer must be

informed, and, if the necessary pressure is to be brought to bear upon him, the milkmen themselves must be informed, and led to deliver the milk as rapidly and as fresh as possible; fourth, when the consumer demands a cleaner and better article, when he objects to dust in his milk, when he objects to a black sediment in a glass of milk, then we shall get a better supply.

I have been particularly gratified with the breadth of the discussion, because it seems to me that is exactly what the whole thing needs. If the Association sees fit to recommit the subject to the committee or to require further elaboration of this matter, that would be well worth it, only I think we should be in no great haste about it. We do not want to wear the Association out in talking about milk; but, for instance, if at the meeting after the next one there should be a further report, it might be well, and I think the committee would very cheerfully undertake to do what they can, and be very specific, and state that a cow should have just so many cubic feet of air, although that is not the most important thing. The first things to be understood are the principles underlying the milk supply. The danger is to-day that the public will get so frightened about milk that they won't drink it at all, and it is better they should not unless it is improved. I never do drink a glass of raw milk; but, as soon as the public become sure that there is care on the part of the farmer and milkman to be clean, and the milk-cans are all clean, we shall get ahead. I do not know that I can personally agree with the idea that it is best to let these cans go back with the drippings of milk in them after standing round in that hot store that has been mentioned. It seems to me it leads the farmer into dirty habits, because he has got his can home in a very unsatisfactory condition; and he might say, "The people in the city don't take any pains to clean the cans," and then he will be apt to take no pains. It is a new point to me, and so in regard to other points I am sure the Committee have learned a great deal; and I only hope the Association has learned something from the committee.

Dr. Durgin.— I move, Mr. Chairman, that the report of the committee be recommitted with instructions to further consider the

matter, and report such rules as can be adopted by the boards of the State and put into practice. I think a report in October would be far better than a report in January, if it could be completed, on account of the possibility of further legislation being needed for getting the best effect of the regulations. In January it would be rather late for any new legislation for the present year; but that matter might be left with the committee if it is able to report in October.

(The motion was seconded and adopted.)

A MEMBER.— I would like to suggest that Mr. Burns or Professor Sedgwick take particular notice of the treatment of cans and of transportation,— the treatment of cans before they are sent back from the consumer,— that that might be embodied in the next report.

THE PRESIDENT.— It is understood the committee will consider the various topics which have been introduced at this meeting.

The meeting was then adjourned.

PUBLISHERS' DEPARTMENT AND BOOK NOTES.

In this department the publishers will include notices of such subjects, germane to the scope of the *Journal*, which would seem to be of interest to its readers, but which are not a part of the transactions of the Association.

THE UTILIZATION OF BY-PRODUCTS IN DAIRIES.

The Food Fair, which is held during the month of October in Boston, contains in its Agricultural Department an exhibit of unique character, which has for its object the demonstration of certain new processes for utilizing the by-products in dairies; namely, the skimmed milk, the buttermilk, and the whey. The exhibit is made by the Dairy Improvement Company; and the processes shown have been devised by Mr. Alexander Bernstein of Berlin, Germany, at present in Boston.

If we consider the enormous quantities of these by-products,— probably more than twenty million quarts per day,— the question of their better commercial utilization appears of the utmost importance as a matter of national economy; but it will also be seen that these new processes are of equal interest to sanitary science, and even touch a social problem.

Commencing with skimmed milk, it seems at first sight rather unreasonable that such milk — which, according to analysis, has still a considerable food value — should be so much lŏwer in price than milk not deprived of its fat. But the fact is that the deficiency in fat not only decreases the food value to a small extent, but materially alters the conditions of the milk itself. When the milk is drunk, and the casein coagulates in the stomach, the interposition of the innumerable microscopic fat globules — and the fat only exists in this form in milk — prevents the curd from forming a compact mass, and the digestive juices readily find access to the particles of casein. The removal of the fat, however, allows the casein to coagulate into a solid substance, which is difficult of digestion. The results are the same in the case of cheese, made out of unskimmed and of skimmed milk.

In order now to obtain a digestible cheese from skimmed milk, Mr. Bernstein proceeds as follows: —

The milk is mixed with a small amount of wheat flour or other farinaceous material. The flour does not dissolve in milk, but can be maintained for a short time in a state of exceedingly fine division, approaching the state of the fat globules. If rennet is added, and certain precautions are taken, the milk will gradually curdle and retain the flour in an even and very finely distributed state in the curd.

The further treatment is as usual; but the cheese, instead of being a hard, leathery substance, is soft and of loose texture. It seems that during the process of ripening the flour undergoes some changes, which impart a pleasant piquant taste to this kind of cheese.

But the utility of this process has another application. This farinaceous curd — as it may be called — can be made so loose as to form a powder when dry; and it can then be mixed with more flour to form a dough suitable for baking purposes. Baking products of this kind are exhibited, which contain the protein matter and carbohydrates in about the proper proportions to sustain life. The protein substance in such a finely divided state is very easily digested and may prove valuable in many cases in which meat is not desirable. Apart from this, the economic value of such products as a general food is very considerable.

In these processes, skimmed milk and buttermilk may be mixed together.

After the casein has been removed, the whey remains. In another part of the exhibit is shown how this substance can be made into a pleasant beverage, of excellent taste and wholesome.

To accomplish this, the whey is treated in such a manner as to become perfectly clear and transparent by the removal of all undissolved matter. The popular idea that a beverage should be clear is not a mere fancy. In drinking, we wish to assist digestion and not introduce undissolved substances, which give additional work to the digestive organs.

The finished whey, to which the name of "Wheyn" has been given, contains a considerable amount of lactic acid and a small amount of sugar, which is added to make it more palatable.

As to its medicinal effects, it has long been known that whey is an excellent tonic in cases of general debility, in liver and in kidney diseases; but the fresh whey is out of reach for the city population, and the danger of possible infectious germs is another objection to its use.

In wheyn, we have a perfectly sterilized product, pleasant to the taste, which has all the essential features of whey as a beverage.

It would be difficult to state whence the medical value of whey is derived. It is a remarkable fact, that animals fed exclusively with an artificial mixture of pure casein with sugar and the salts of the milk, all in proportion in which they are contained in milk, will invariably die within a short time, showing that there must be something in the constitution of milk which is not shown by analysis.

Wheyn has been made sparkling to answer the purpose of a table beverage, and in this form it is shown in the exhibit of the Dairy Improvement Company. It does not contain any alcohol or

any substitute for it, which is often mixed in the so-called temperance beverage; but it is claimed that it has the pleasing effect of an alcoholic beverage. If this is the case, the temperance party should find in it a quiet but eloquent assistant of great convincing power. It certainly ought to be a most wholesome drink.

MODIFIED MILK FOR INFANT FEEDING.

Modern scientific writers, of all schools in medicine and in all civilized countries, unite in affirming that milk should be the sole food for the baby. Those specialists whose writings are regarded as most authoritative further insist that nothing not native to milk shall be given to an infant during at least the first ten months of life. Nature, they say, has spoken the final word on this subject through the tables of infant mortality; namely, that milk alone is the baby's proper food, breast-milk if plentiful and good, but, failing this, the milk of some animal modified to conform in all particulars to the natural model. Practically, the cow has, for obvious reasons, been chosen as the foster-mother of the human race.

In short, some modification of cow's milk is the only proper substitute for the milk of a healthy and suitable human mother.

A complete study of the model given by nature and of the copy provided by art reveals the following great facts regarding the whole subject of substitute feeding.

That, as nature provides variety, and not uniformity, in the milk of the breast, therefore successful substitute feeding largely depends upon the provision of a modified milk exactly suited to the digestion and assimilation of the especial individual infant, and that no routine mixtures can be employed,— in other words, that there should be provided for every baby its own special milk.

Perfection in feeding requires great accuracy in the modification of the milk employed, as slight differences in the relation of the percentages of the milk constituents often determine the success or failure of the feeding.

It is indispensable that the milk employed shall be pure, fresh, and safe, derived from healthy animals, carefully produced, and hygienically handled.

These are the requirements imperatively demanded by modern medical science in the feeding of infants. How can they be met?

It is a matter of common notoriety that the milk of commerce does not meet the requirements of scientific feeding. It is neither pure, fresh, nor safe. Nor can sterilization or pasteurization replace those aseptic precautions which should surround the production of milk intended for infant feeding. Sterilization cannot make a stale milk fresh nor a diseased milk nutritious.

Further, it is certain that the so-called "Home Modification" of milk is unsafe and unscientific, both because the milk constituents of the milk usually employed are unknown, and because this milk always contains more or less harmful bacteria.

In like manner, also, the widely advertised "perfect substitutes" for mothers' milk are all defective in a fatal way; namely, that they presuppose a knowledge of the milk constituents of the basis of the food, which is unobtainable.

In short, the successful feeding of a healthy infant and the treatment of a sick one demand *Modified Milk.*

Substitute feeding by "Modified Milk" requires

First. Knowledge on the part of the physician of the case as an individual, so that a milk may be employed exactly suited to the especial infant.

Second. Knowledge, both by the physician and by the modifier, of the chemical, physical, and bacteriological characteristics of both breast-milk, which is the model, and of modified milk, which is the copy.

Third. Accuracy on the part of the modifier in the putting up of the prescription sent in by the physician.

Fourth. A safe, pure, fresh, and stable milk to be used as the basis of modification.

These requirements are all practically met at the Walker-Gordon Laboratories.

Infant feeding in the practice of pediatrists is now scientific in theory, and, where the Walker-Gordon Laboratories are employed, is also scientific in practice.

To quote the language of one of the greatest authorities upon this subject, "The establishment of these laboratories has marked a new era in preventive medicine, and has made possible the scientific feeding onfants."

The Walker-Gordon Laboratories were founded and are employed for the use of physicians in the scientific feeding of infants and invalids.

These establishments dispense "Modified Milk" upon physicians' prescriptions only, and sell a whole milk that is safe for nursery use.

They are known as "the physicians' right hand in feeding."

PES PLANUS.

There are few abnormal conditions more common and less often recognized than "pes planus," or flat-foot. The symptoms simulate so closely rheumatism in all of its forms that it is more often diagnosed as this condition than what it really is. The pain may be between the third and fourth toes, across the instep, in the

upper part of the calf, and even at the source of the sciatic nerve. Sometimes there is swelling that may extend to the knee. Often the condition is called rheumatic gout, from the amount of inflammation and tumefaction around the ankle joint. The diagnosis, however, between the results of flat feet and rheumatism should not give the physician trouble if he will remember that rheumatism feels better after exercise, while flat feet feel worse. In all cases that do not yield readily to a rheumatic treatment, it is always wise for the physician to examine the foot carefully; and, if he finds a tendency, although slight, to the breaking down of the arch, he should employ a suitable support, and in a very great proportion of cases he will obtain relief. There are many kinds of supports used to overcome this condition. The old style metal plates, however, are going out of use, both on account of their weight and clumsiness and also from the fact that it is necessary to take a plaster cast of the foot. A great improvement over these, and undoubtedly the best article now manufactured for this purpose, is the so-called "Improved Arch Supporter." These consist of three steel springs encased in leather. They require no plaster cast, as they are fitted directly to the foot, and have a normal arch. They are also much easier to the foot than the old style metal supporters. The price is much less to the patient, as no plaster cast has to be taken.

BOOK NOTES.

Another new book is to be added to the rapidly increasing literature on pediatrics, a volume entitled "About Children" being announced by the Medical Gazette Publishing Company of Cleveland. The author is Dr. Samuel W. Kelley, Professor of Diseases of Children in the Cleveland College of Physicians and Surgeons.

A valuable volume just published by Messrs. William Wood & Co. is the "Atlas and Essentials of Bacteriology," by Prof. K. B. Lehmann, Chief of the Hygienic Institute in Würzburg, and Dr. Rudolph Neumann, Assistant in the Hygienic Institute in Würzburg. It is finely illustrated with 63 chromo-lithographic plates, comprising 558 figures and numerous engravings.

The course of lectures on Pharmacology and Therapeutics delivered at St. Bartholomew's Hospital during the summer session of 1896, by T. Lauder Brunton, M.D., D.Sc. (Edin.), LL.D. (Hon.) (Aberd.), F.R.S., who is fellow of the Royal College of Physicians, Associate Fellow of the College of Physicians of Philadelphia, Honorary Member of the Pharmaceutical Society, Physician and Lecturer on Pharmacology and Therapeutics to St. Bartholomew's Hospital, has just been published by the Macmillan Company, under the title of "Lectures on the Action of Medicines."

JOURNAL OF THE

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

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OCTOBER QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The July quarterly meeting of the Massachusetts Association of Boards of Health was held at Gallop's Island on Thursday afternoon, October 21, the President, Dr. H. P. Walcott, in the chair. The following is a report of the proceedings: —

THE PRESIDENT. — Will the Association come to order? In behalf of the Executive Committee, I desire to submit to the Association the following names of persons recommended by that committee for membership in this Association: —

GEORGE E. SEDGWICK	Boston.
GEORGE W. FITZ, M.D.	Cambridge.
A. N. SARGENT, M.D.	Salem.
L. H. HOWARD, D.V.S.	Boston.
GEORGE H. ELLIS	West Newton.
J. M. PARKER	Haverhill.
C. A. DENNEN	Pepperell.
N. I. BOWDITCH	Framingham.

Is it your pleasure that these gentlemen be elected to membership in the Association? If so, you will signify it by saying aye. [The vote was taken, and the President declared the above-named gentlemen elected to membership.] Is there any other business to be brought before the Association at this time?

Mr. Brimblecom.— Mr. Chairman, I have a motion I would like to make: that the Committee on Legislation be requested to consider, and to report at the next meeting of this Association, upon the advisability of legislation to prevent the pauperization of persons, by reason of their inability to maintain themselves or their families, when afflicted with any disease dangerous to the public health.

In making that motion, I should like to say that my attention has been called to the matter this last summer, and that it seems a great injustice that persons who are sick with contagious diseases, and who are unable to pay the expense themselves, should be pauperized by the fact that such charges have to be paid by the city or town. It seems to me that this is exactly in line with the matter of the insane. The State has already recognized the fact that insane persons are confined involuntarily, and that they cannot be made paupers by reason of the charges for such confinement. It seems to me that these cases come under practically the same head, and I therefore move that the Committee on Legislation be requested to consider and report to the next meeting upon this subject.

Dr. Durgin.— I second the motion.

The motion was then put by the President, and unanimously carried.

The President.— The Secretary will read the records of the last meeting.

The records of the July meeting were then read by the Secretary.

The President.— Is there any objection to the record as read to you? If not, it will stand as the record of the last meeting of this Association. Is there any general business to be brought before the Association at this time?

Secretary Farnham.— Mr. President, I hereby give notice in

writing that I shall, at the next meeting, present to the Association for adoption the following amendments to the constitution: —

PROPOSED AMENDMENTS TO CONSTITUTION.

ARTICLE III.

SECTION 1. All members of a board of health in any city or town in Massachusetts, the executive officers of any such local board, the members of the State Board of Health of Massachusetts, and such other persons as shall be approved by the Executive Committee, shall be eligible to membership.

SECT. 2. Applications for membership shall be considered by the Executive Committee; and, upon favorable recommendation by the committee, the votes of a majority of the members present and voting shall constitute an election.

ARTICLE X.

SECTION 1. The Committee on Scientific Papers and Publications shall consist of the First Vice-President and two active members, to be appointed by the President.

SECT. 2. It shall be its duty to procure scientific reports and papers to be read at the meetings of the Association, and all such papers must be approved by a majority of the committee. It shall also, when so directed by the Executive Committee, make the necessary arrangements for the publication of scientific papers and reports.

ARTICLE XI.

SECTION 3. Special meetings may be called by the Executive Committee. The Secretary shall give to all members due notice of every meeting.

ARTICLE XII.

SECTION 2. All members whose dues shall remain unpaid for a period of three months after receipt of the annual bill from the Treasurer shall be dropped from membership.

THE PRESIDENT.— These various amendments have been brought before you in accordance with the rules of the Association, and will be in order for action at the next meeting of this body. The next business upon your programme is a report upon "such rules as can be adopted by the boards of the State, and put in practice, for the protection of milk supplies from pollution." The report will be presented by Professor Sedgwick.

Professor Sedgwick.— Mr. President, those who were present at the last meeting will remember that the chairman of the committee on this subject begged for more time than would be given if a report were to be brought in at this meeting, but that the committee were instructed nevertheless to report to-day. It has been found very difficult, however, for some, at least, of the committee to give any attention to the matter; and the report which I have the honor to bring before you to-day is not, therefore, as complete as might be wished.

Before actually proceeding to the rules which we have undertaken to prepare, and more especially as some members of the committee who are coming here in a few minutes have not as yet come in, and ought to be here, I should like briefly to bring up to date, as it were, this whole subject. The Association is now sufficiently informed — and, it seems to me, very well informed — on the general question of the needs of a sanitary control of milk supplies.

It is only a few years since we had to say that such safeguards as were placed about milk or were called for by any one were safeguards in regard to the addition of water. And to put good pure water into milk is probably, from a sanitary point of view, one of the least harmful things that could be done. A position like that, however, was not, and is not, consistent with modern sanitary science. If that were our position, there would be no occasion on the part of an association like this for making any rules, or for this Association to deal with the matter. But I believe that every member of the Association feels, as I do, that the time has now come when something more has got to be done. And, as I understand it, it is because the association feels so that this committee was requested to look into the matter, and actually prepare rules which could be adopted, with such modifications as each city or town should need, for the better sanitary protection of milk supplies.

The reason for this change of view is obvious. It is that sanitary science now holds, and holds rightly, that milk is one of the most easily contaminated articles of food, that many and serious epidemics have been traced to milk; and, now that we are looking into it, it is found that cow stables are not what they should be, and that there are opportunities — very numerous, altogether too numer-

ous — for the serious incrimination of this most fundamental food product. That is the reason why this Association feels it its duty to take hold of the whole matter. The advancement of sanitary and medical science has obliged persons having the care of the public health to give their attention with renewed energy to the matter of the sanitary control of milk supplies. It is no longer sufficient to watch against adulteration and fraud: we must now begin to take care that milk does not contain the germs of disease. And I believe that in that respect we are as far on as anybody in the world. I visited England this summer, and looked into the milk supply question there somewhat; and I hold in my hand a copy of the regulations of London County Council in regard to dairies, cow-sheds, and milk-shops. Many of the rules and regulations which we shall propose are — in spirit, at any rate — foreshadowed in this older community of London. As has happened so often in sanitary endeavor in this country, we find that it has been foreshadowed by sanitary endeavor in some older country. Nevertheless, I do not find that they are any further on there, practically, than we are here; and I believe that this Association and the people of Massachusetts whom we represent have an opportunity to lead the world, as it were, in this matter. To do so, however, we must of course be sure of our ground. We must be as reasonable as the circumstances will allow, while watching over the safety of the people, must be careful not to trespass any farther than is absolutely necessary upon individual initiative or individual rights.

The one fact which the committee has sought to bring out in this particular report, and make very strong and clear, is that a local board of health should have, first, knowledge, and, second, control of the sources of milk supply and the character of the milk distributed within its particular district. And to that end the committee, and more particularly one member of the committee — not the chairman — who has been able to give more time to it than the others, has put together a number of articles and sections which the committee would recommend to this Association to be considered, and, if approved, adopted, and recommended to boards of health as the basis for legitimate and reasonable sanitary protection of public milk supplies.

The present situation those of you who are connected with boards of health know very well. It is simply one in which the board has little or no knowledge of the actual sources of the milk brought into its district, and little, if any, control over the milk after it has got in. It is possible, we believe, to remedy this condition, and along the lines now to be indicated.

I will now read, if you please, the actual rules which we would propose; and I will read them all through, as far as we have them, without comment or remark, in order that the general bearing of them may be obvious and the general effect clear. Then, if it is your wish, I will read them over one at a time, or in any other way that you like, so that they may be discussed in open meeting. We are not at all sanguine about their acceptability. It is a good deal easier to order a committee to get up some rules than it is to get them up or to approve them, when got up; for we have found, as of course was to be expected, that what would appeal to a citizen of Boston or be useful to the Boston Board of Health is not, without considerable amendment and modification, likely to be useful to the board of health of a smaller city than Boston or of a town. In making general rules, therefore, it is difficult to hit all needs; and these which we offer are not to be regarded as iron-clad or as adapted to all localities or conditions. It is presumed that each board of health will modify them to suit its own needs, and they should be heard by you now with that fact in view. It should not be supposed that the committee for a moment imagines that the following rules are as applicable to North Adams and Greenfield, we will say, as to Boston and Fall River, or to Fall River just the same as to Boston.

Now, with so much of preface, I will proceed to read the rules which have been drawn up, and which have met the general approval of those members of the committee who were present. One member of the committee was ill, and unable to be with us in our debating of the proposed rules; and another was not notified in season.

RULES SUGGESTED BY A COMMITTEE OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH FOR ADOPTION BY THE BOARDS OF HEALTH OF THE STATE FOR THE PROTECTION OF MILK SUPPLIES FROM POLLUTION.

ARTICLE I.

SECTION 1. All persons engaged in the production of milk for sale, or in the sale, delivery, or distribution of milk in the city or town of ——, shall annually, on or before May 1, make written application, on forms prescribed by the board, for a permit or license.

SECT. 2. No person shall engage in the business of producing milk for sale, or in the sale or distribution of milk, in the city or town of —— after April 30, 1898 (?) without a permit or license to do so signed by said Board of Health, and under such conditions as said Board of Health may impose, revokable at the pleasure of said board.

SECT. 3. The conditions under which every cow is kept, whose milk is brought into any city or town, or kept, delivered, distributed, sold, or offered for sale, in such city or town, shall be made known to the local board of health in such detail as the board may require, and shall be approved thereby; and no milk except that delivered from such cows shall be so brought, kept, delivered, distributed, sold, or offered for sale.

SECT. 4. No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is delivered have within one year been examined by a competent authority, and shown to the satisfaction of the local board of health to be free from disease.

SECT. 5. All persons having a permit or license to sell, deliver, or distribute milk in any city or town, shall keep a copy of the same constantly posted in a conspicuous place on premises and vehicles from which milk is sold or distributed or in which milk is kept or delivered.

ARTICLE II.

SECTION 1. No milk shall be kept for sale or distribution, or handled, transferred from can to can, or stored in any stable or similar place, or in any room used in whole or in part for domestic or sleeping purposes.

SECT. 2. Milk shall be stored or regularly mixed, cooled, or poured from can to can only in a room not directly connected with a stable or stables, provided with a tight floor, and kept constantly neat and clean, the walls of the room being of such a nature as to allow easy and thorough cleansing. The room aforesaid shall contain proper appliances for washing and sterilizing all utensils actually employed in the storage, sale, and distribution of milk in said building, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after having been so used.

SECT. 3. No urinal, water-closet, or privy shall be in the aforesaid room or any room directly connected therewith.

SECT. 4. All milk directly after it is drawn from the cow shall be at once taken to, and be at once filtered, cooled, and stored in a room such as is described in Article II., Sections 1 and 2.

ARTICLE III.

SECTION 1. Milk kept for sale in any store, shop, market, bakery, or other establishment, shall be always kept in a covered cooler, box, or refrigerator, properly drained and cared for; and while therein shall be kept tightly corked or closed, and only in such location and under such conditions as shall be approved by the local board of health.

ARTICLE IV.

SECTION 1. All cans, bottles, or vessels of any sort used in the sale, delivery, or distribution of milk to the consumer, must be cleaned and sterilized by the milk dealer before they are again used for the same purpose.

ARTICLE V.

SECTION 1. Every person engaged in the production, storage, transportation, sale, delivery, or distribution of milk, shall immediately, on the occurrence of any case or cases of infectious disease, such as typhoid, scarlet fever, or diphtheria, either in himself or in his family, or amongst his employees or within the building or premises where milk is stored, produced, sold, or distributed, take care that the local board of health is notified of such case or cases, and at the same time suspend the sale or distribution of milk until authorized to resume the same by the local board of health.

SECT. 2. It shall be unlawful for any person suffering from a contagious or infectious disease, such as typhoid fever, scarlet fever, or diphtheria, to handle, transport, deliver, mix, taste, work over, or distribute milk, or in or about places where milk is stored, sold, or distributed, or to serve as a milker or milkman. No vessels which have been handled by persons suffering from such diseases shall be used to hold or convey milk.

In addition to these, which we propose to the Association to recommend or to adopt as guides, the committee have certain recommendations to make, and also certain forms of application blanks suitable for the carrying out of the rules here proposed. In preparing them, we have been much guided by the blanks now in use in the city of New York; and Dr. Burr, who has had much to do in the drawing up of these rules, and given a great deal of time and trouble to the whole matter, has with him copies of the proposed application blanks which we would recommend, or which we would sub-

mit as typical of what might be kept on file and filled out by persons seeking for permits or licenses.

But, before proceeding to this part of the subject, I may briefly recapitulate what I have read, with a comment or two. In the first place, the idea of the rules is to make the people who deal in milk responsible to the board of health,— not merely responsible to a milk inspector, however excellent he may be, but to make them, if possible, feel their responsibility to, and to bring them under, a definite sanitary authority.

In the second place, while I believe it is a fact that the ordinary licensing of milkmen is largely a matter of a small fee and of routine, so that any one can get a license, the milkman of the future, if these rules are adopted, or anything like them, will be made to feel that he must show cause why he should be allowed to sell milk, and should be made to feel the serious sanitary responsibility of the work in which he is engaged. It is not desired to be unduly severe upon him, but only so severe as the necessities of the case and the health of the people absolutely require. He will therefore on this plan make application for a permit annually. And this is done simply to make sure that in his application blank the facts shall be brought up to date, as to the people from whom he gets milk, as to the location of the farms upon which the milk is produced, as to the sanitary condition of those farms as far as it can be determined, and so forth and so on. The great point, the whole point of this matter so far, is to make milkmen realize that they are engaged in a business which requires sanitary supervision. And, to make them do that, it was felt that no better plan could be adopted than to require them to have and to keep posted a permit to carry on what might almost be called a "dangerous trade," though I do not wish that term to be applied in this connection, because it is too harsh.

In the next place, the second section forbids any one to sell milk without such permit.

The third makes it certain, as far as such a thing can make it certain,— of course, all this depends on the way on which it is carried out by the boards,— that the board shall actually have information, of a rather concrete kind and specific nature, of the conditions under which the milk is produced. They shall not merely publish cer-

tain conditions, and let the man certify that the farms from which he gets this milk do conform to certain conditions, but they shall require him to actually report where the farm is, and how many barns it has, and what sort of a stable, and all that sort of thing. And my own idea is, though I do not know that I am supported in this by the committee, that, as boards of health are able to do so, they shall send inspectors to see what the actual conditions on these farms are. Of course, that is an easy thing for a small city; but it is a very difficult thing for a large city, like Boston. It would not be easy, off hand, to send inspectors all over the States of New Hampshire and Massachusetts, and a considerable portion of Maine, Rhode Island, and Connecticut, to see what the actual condition of the cow stables is. But, until we do reach that point, we shall never wholly solve this problem.

I should like to say, by way of parenthesis,— and I appeal to farmers and milkmen themselves,— that the public is getting very sensitive on this question. I had a good illustration of it while I was in England. Danish butter is very much sold in England, and very much liked by the people. The English farmer, of course, is not specially in favor of it, because it cuts into his market. And the whole subject was thrown into a ferment, while I was over there, by an article, in the *North British Agriculturist*, describing the serious sanitary condition or unsanitary condition of the Denmark cow stables and methods of keeping cows. The fact is that at last, after all the talking and begging that we have been doing for some time, people are beginning to turn their attention toward cow stables and farmers. And it has got to come to pass before long that farmers who wish to sell milk, and sell it successfully, and to sell butter successfully, have got to take such care of their cows as would be taken by a breeder of horses; and cows have got to be looked after, and not allowed to have their udders and sides caked with manure. And the milk farmers will not be allowed to have the milk come from their farms tasting "cowy," as it is called. Now this third section of Article I. is an attempt to enable and to encourage boards of health to look into these matters; for we say that the conditions under which every cow is kept whose milk is brought into any city or town, or kept, delivered, distributed, sold, or offered for sale in such city or town,

shall be made known to the local board of health in such detail as it — that is, the local board of health — may require, and must be approved thereby, and that no milk except from such cows shall be brought, kept, sold, delivered, etc., in that town.

The next section refers to the health of the cows. A critic writing on the English law has said, and very well said, that it makes good provision for the physical condition or health of the people, of the human beings, employed about the milk industry, but pays no attention to the cattle themselves. That is a sound criticism, unquestionably; and, having that in view, we have undertaken to go a little further than they have gone, and to require, but still in a way which we believe will not impose any serious hardship, that, "unless the cows from which this milk is derived have within one year been examined by a competent authority,"— and no one knows better than the committee how loose that term is,— "and shown to the satisfaction of the local board of health to be free from disease," its sale shall not be allowed. The committee felt that, while that was not saying much, perhaps, it was pointing in the right direction; and if any particular board of health sees fit to make that stronger, and to require an examination by a particular authority defining it, the committee would be very glad. But it was felt, in the present state of the art, if so it may be called, it was not possible to go much further.

The next article requires the keeping posted of a permit to sell the milk. I can say from personal experience that is an important thing. You go into a little milk-shop on some side street in a city, and you cannot tell at first whether it is a milk-shop or not. You have to inquire around, "Do you sell milk?" And, if a woman is in charge, as is often the case in these little places, and she happens to say no, you go out; and you may miss a milk-shop in that way. They are not registered in any public manner which you can easily get at; and it is no more than fair that they should have something posted, so that an inspector, learning of an epidemic and looking at the milk supply, should be able to know at once whether that is a milk-shop or not.

The next section deals with the question of the room in which the milk is to be handled. Now there is a certain moral reason in this,

— the requiring of a decent room, a separate room. Of course, in good dairies, those rooms have existed for many years. This is no hardship on them. But there are many farms where the milk is taken from the cows, and emptied into the cans right in the stable or in some dusty barn or in some undesirable adjoining room, used perhaps also for a horse stable, it may be. And it is very common in this city to have the apparatus for putting up milk, or, as it is called, mixing milk, in places where the horses' tails are not very distant. It has seemed that it would be well to require, if possible, that milk shall be handled only in a decent room, not directly connected with anything objectionable. Every one knows that the manner of handling will improve the quality of it. Every one knows that the uniform put on the street-cleaning employees of New York improved their tone at once, as it has improved the tone of our railroad service and everything else where used. A man in uniform feels more responsible. Now we do not propose to put these men in uniform. Bnt we do propose to put the business, as it were, in uniform; that is to say, have the room worthy of this important industry. We should have liked to say the building, a separate building, where milk could be treated as a delicate food product, which it is, and taken care of as it should be. But we felt that the best we could do was to require that it should not be handled in any room used in whole or in part for domestic or sleeping purposes, or any place directly connected with a stable or stables, and that such a room should have a good tight floor. We wanted to say an impervious floor, a concrete floor or cement floor. But some members of the committee did not feel that we ought to do it, because, while that would be all right in Boston, it would be a hardship on some of the milk dealers in some of the little towns; and of course we are anxious, as far as possible, to do something which shall be of universal application throughout the State, though I am not altogether sanguine that it is possible to do that. The conditions are so different in a big city, like Boston, and in a small country town that I am not at all certain but we are undertaking to do something that it is not possible to do. And I would have it borne in mind by this Association that this was not voluntary work on the part of this committee. They had no desire to sit down and draw

up these rules, knowing the difficulties involved, but were ordered to do it at the last meeting, and cheerfully accepted the duty.

Obviously, no urinal, water-closet, or privy should be in the aforesaid room or in any room directly connected therewith. Obviously, also, the milk, after it is drawn, should be at once taken to some such room, filtered, cooled, and stored in it.

Then comes the subject of milk-shops and stores. Some members of the committee felt that it would be very desirable to take the milk trade out of the grocery stores and meat markets if we could. And, if you go to the people who sell milk in those places, they will always groan, and say that they do not want to do it, that they only do it to accommodate their customers; and some members of the committee thought we should relieve them of that trouble by making a rule that they should not do it. But other members thought that what they say is only talk, that they really do want to sell milk, and that it would be regarded as a hardship if we proposed a rule that markets and butcher-shops should, under no circumstances, sell milk. Nevertheless, we felt that it was not requiring too much to have the milk, when so sold, kept under decent conditions. And it was desired by some to require that it should be kept in separate refrigerators, coolers, or boxes. The committee, as a whole, finally decided that it would not be well to do that under all the circumstances; and so a more general rule was made,—that it should be kept in a covered cooler, box, or refrigerator, and while there kept tightly corked and closed, that this refrigerator should be properly drained, and that the whole thing should be under such conditions as should be approved by the local board of health. It would be a very simple matter for the inspectors of the local board of health, as they are going about, to visit these milk-shops,— not all in one week, perhaps, but on their rounds,— and see where the milk is kept, and see if it is decently kept. And, if the board has good inspectors, as all Massachusetts boards are supposed to have good inspectors, that would be a matter quite easy to carry out. They could report information which would be passed on by the local board of health, and rules governing the subject could easily be made.

With regard to the cleaning of the cans, bottles, vessels, and all

that, it was thought that a rule was certainly of fundamental consequence, and that these should be cleaned, and not only cleaned, but sterilized. We have got to rise to the point of sterilization. It is a high point to reach, I know; and I do not suppose it will be faithfully carried out for a long while, but that is the goal toward which we are striving. If you say the cans shall be cleaned or thoroughly cleaned, they will be cleaned, as very many of them are now, in warm or warmish water. They will not be thoroughly cleaned from a bacteriological point of view, or even a sanitary point of view. And so we have said "must be cleaned and sterilized"; and by that we mean treated with really scalding water in abundance or with live steam. That may or may not meet your approval.

With regard to the contagious diseases there can be, it seems to me, very little question that every person actually engaged in the sale or distribution of milk should, as soon as he has an infectious disease himself, or has it in his family or among his employees or within the building or premises, report it (of course, it is the business of the doctor to report it; but then it is his business, too, so as to make the thing doubly sure), or see that it is reported, and should suspend the sale of milk until he is authorized to resume it. Also it seemed desirable to have it stated that it should be unlawful for any person suffering from contagious disease — and of course whether he is so suffering would have to be determined by a physician — to go on working over the milk, and distributing it, and so on. We have sometimes had cases where a man who was pronounced by the physician to be probably in the early stages of typhoid fever has refused to knock off work about milk, but has persisted in going on, saying he felt all right and was all right. Those cases are not as rare as some of you may think. Very naturally, a man, laboring in that way, is desirous not to lose his place just because he is a little feverish, and does not wish to knock off work until, perhaps, he is so sick he cannot ride on his wagon or something of that kind. And it should be distinctly known that the handling of milk under those conditions is not only undesirable, but is unlawful. So, at least, your committee thinks.

So much of the report we have prepared, and would submit to you to-day. But I think that, before the discussion is opened, it

might be well, Mr. President, to ask Dr. Burr to give us the outlines at least of those blanks,— that is, the application blanks which he has ; and I think he has also in his pocket, somewhere, outlines of certain recommendations which we might make, but which it was not intended should be embodied in the ordinances or definite laws. Possibly, he is not ready to do that part of the matter ; and, possibly, you will wish to give the committee more time to report at some future meeting on matters which still remain to be touched upon. The committee is well aware it has not covered all the ground ; but it felt that it was important to strike first at the root of the evil, and to correct it by making sure that the milk trade, the milk industry, shall come to be recognized by those who deal in it as one legitimately under sanitary authority. That is the fundamental idea, it seems to me ; and, so much, at least, we have tried to cover in these proposed articles and sections.

The President.— The Association would be very glad indeed to hear from Dr. Burr.

Dr. Burr.— Mr. Chairman and gentlemen, as your committee has reported, it seemed best that we should get up certain application blanks which should be filled out by those applying for permits to sell milk. We divided those blanks into three forms, one of which applies mostly to the milk dealer. We speak of the milk dealer, meaning the milk pedler, the man who goes to the railroad and gets his milk, takes it home to the barn and there mixes it, puts it into the small cans and into the ice chest, and delivers it the following morning.

Then we have a second blank that is made out for the store people, those who simply receive the milk at the store and sell it.

The third is a blank which both the store seller and the wagon milk seller shall fill out when they apply to the board for permits.

In regard to the barns and the cows where milk is produced, whether it be in this State or in any other State, as Professor Sedgwick said, we copied the New York laws to a certain extent.

I have here the application blanks which are used by the Board of Health of New York, and I will hand those about. We have added,

I think, considerable to those. [The blanks were then passed about the room.]

Now, in regard to application blank number one, which is used by the milk dealer, who goes to the station and gets his milk, and carries it to his barn: —

Name and business and location and district in which the milk is sold. That is, in a large city like Boston, one man may be selling entirely in Dorchester, and another man in Roxbury.

The amount sold per day?

Do you keep cows? If cows are kept, he fills in special blank number three.

From whom do you purchase your milk? And, if he purchases milk, he also fills in blank number three.

Time when the milk enters the city, over what road, and from what depot? In that way we will know over what road it comes.

Marks on the cans?

Where is the milk stored and cared for? That is, of course, at his place of business, which would be, in these cases, mostly in the barns.

Is the milk-room or building in direct connection with the stables, sleeping room or rooms used for domestic purposes?

Of what material is the floor of the milk-room?

How is the milk-room drained?

Is there a urinal or water-closet in this room or room opening into the same?

Means of cooling and storing the milk? In an ice-box or refrigerator?

How drained?

Do you wash and sterilize all utensils in this milk-room, and the method of sterilization?

Application blank number two, which is confined to the store milk dealers: —

Name, business, location, quarts sold per day, from whom purchased? If purchased or obtained from farmer, milk agent, or farm belonging to the applicant, he also fills in blank number three.

Location, time of delivery, marks on the cans, is the milk kept in a separate cooler during sale? Is the cooler or refrigerator drained?

What is kept in the immediate vicinity of the milk? We mean by that, in provision stores, we want to know whether the meat and vegetables are in close proximity to the milk refrigerator.

Do you wash and sterilize all measures and utensils?

Where are the utensils washed and sterilized? The reason we ask that is that in a great many of these smaller stores there may be a kitchen or sleeping-room off from that store. We want to know whether they are washing the cans in that kitchen or not.

Method of sterilizing?

Is there a urinal or water-closet in this store or room opening into the same?

Does the store open into a sleeping room or rooms used for domestic purposes?

Special blank number three: —

This is the blank that is filled out by each applicant for the sale of milk. That may be filled out through the contractor, or it may be sent direct to the farms where the milk is produced and filled out there, or it may be obtained through an inspector or agent of the board of health receiving the name of the milk agent or contractor.

Business address? Name of producer of milk. Oftentimes the contractor, of course, and not the producer.

The city or town, county and State, shipping station, railroad?

Number of cans per day? Marks on the cans?

What milking is shipped? Time of arrival at the country railroad station? That is, we want to know at what time the milk is delivered to the railroad station. In that way, we will find out the age of the milk and the length of time after it has left the farm; in other words, the time in transit while in the hands of the contractor or railroad.

The time in transit?

The number of cows?

Are the cows regularly inspected?

Is the stable well lighted and ventilated and drained?

Condition of floor?

Where is the manure stored? If in cellar, what is the condition of the cellar?

How often are the cows cleaned?

Average amount of air space per animal?

Condition of cow yards?

Where is the milk stored?

Is the milk-room or building in direct connection with the stable, sleeping room or rooms used for domestic purposes?

Of what material is the floor of the milk-room?

Is there a urinal or water-closet in this milk-room or room opening into the same?

How is the milk-room drained?

Means of cooling and storing the milk, whether in an ice-box or refrigerator? How drained?

Do you wash and sterilize all utensils in this milk-room?

Methods of sterilization?

Water supply for cows? Water supply for cooling milk?

That completes the three blanks. I will send these blanks about. I think, Mr. Chairman, that is all I have to submit.

Mr. Coffey.— I would like to ask Professor Sedgwick to read again that section in Article I. which empowers the boards to provide a test or examination.

Professor Sedgwick.— Of the cattle, do you mean?

Mr. Coffey.— Of the cattle, yes.

Professor Sedgwick.— "No milk shall be sold, offered for sale, or distributed in any city or town, unless the cows from which it is delivered have within one year been examined by a competent authority, and shown to the satisfaction of the local board of health to be free from disease."

Mr. Coffey.— Is it contemplated, in that, to exact the tuberculin test?

Professor Sedgwick.— That is for the local board to decide. That was not defined.

Mr. Coffey.— Are these resolutions to be incorporated in a statute, or are they suggestions to local boards?

Professor Sedgwick.— I think they are merely suggestions. That was my idea of the thing. I do not remember, at the moment, the exact wording of what we were told to do.

Mr. Coffey.— How are you going to get around the fact of the

statute already in existence, which puts it in the hands of an inspector of milk to be appointed by the mayor, and does not give it to the local boards at all?

PROFESSOR SEDGWICK.— Does not give what?

MR. COFFEY.— The authority over licensing the sale of milk.

PROFESSOR SEDGWICK.— Well, we had a lawyer on the committee, — Mr. Gove, of Salem; and, I believe, while he did not wish to say positively that he was certain the thing could be done, he was sufficiently so to go on with the work. He felt that it was within their power for the local boards to make these ordinances, if they saw fit. That was my understanding, at least, of his position.

MR. COFFEY.— As I understand it, there is a general statute law now that provides that inspectors of milk shall be appointed by the mayor and confirmed by the board of aldermen.

PROFESSOR SEDGWICK.— It is not intended to contravene any statute or anything of that sort. It is rather to make rules in addition to these.

MR. COFFEY.— What authority has the local board over inspectors appointed by the mayor?

PROFESSOR SEDGWICK.— None whatever, I presume; but it has power to appoint its own in addition to those.

MR. COFFEY.— In addition to those?

PROFESSOR SEDGWICK.— Yes, not in place of those, of course.

DR. DURGIN.— As I understand it, this is to be a regulation made and adopted by each local board of health. Under the general law the boards of health are empowered to make these regulations, which become in themselves a law; and, unless they conflict with the statute law, they are in full force. And I do not understand that anything drawn up in this way will conflict with the present statute law on the inspection of cattle.

MR. COFFEY.— I do not clearly understand that. It seems to me that the board of health, if these rules are adopted, could refuse a license to a milk dealer. Now suppose the regular inspector appointed by the mayor and confirmed by the board of aldermen approved that license: would there not be a conflict at once? Now you know the statute law. Lynn has a special statute, empowering the Board of Health to license milk dealers. Boston, in its charter,

has authority in the Board of Health over the milk business; and I think at Lowell, through an understanding with the city government, the Board of Health there have appointed a milk inspector, or at least the mayor appoints an inspector whom the Board of Health nominates. And, as far as I know, those are the only three places in the State that have that authority. At Worcester, for several years, in addition to being health officer, I was milk inspector. There the inspector receives $150 or $200 for his services. It is merely routine work, and very little inspection is done. Most of the work is simply the issuing of licenses. Of course, it stands to reason that a man cannot give a great deal of his time for $150 a year; and consequently his other duties, which may take up most of his time, for which he receives the greatest recompense, are attended to, to the detriment of that. So that it would become there simply a matter of routine. He issues licenses, occasionally he takes some samples and makes a rough test, looking for adulteration; and that is all. And that system has always been in force there. And it does not seem to me that, unless you change the statute law, putting it in the hands of the board of health, the mere adoption of the rules while that statute remains in force would amount to anything. It would simply precipitate a conflict between the board of health and the mayor and aldermen.

Dr. Simpson.— Mr. Chairman, this subject is one I am considerably interested in. I represent a small city, of about 23,000 inhabitants only, in the north-west corner of the State,— North Adams. And coming, as we do, in direct contact with the milk producers, it occurred to me that, if anything is to be done for the purity of milk, it must be done largely through the representatives of the smaller towns, who, in cleaning up the premises from which the milk is sold in their own cities and so setting the example, shall clean up the premises of the larger cities and towns. The milk in Boston, and in a number of the large cities,— in all the large cities, — comes primarily of course from country towns. Now, if the board of health in each town could control the purity of the milk in that town, whether the milk is sold in its own town or whether the milk is exported from that town, why, that would give you pure milk in the large cities. And, in order to give ourselves pure milk, I have

been for a year now trying to get either some rules passed by our board or an ordinance by our city, to control the sale of milk. And I have succeeded thus far,— that I have myself drawn up some rules; and I came here to-day, knowing this report was to be made, to determine, upon my return, whether these rules shall be embodied as the rules of the board or whether I should try to get our city to pass an ordinance to this effect.

Now the point that the gentleman brings up, of the legal authority, I have looked into pretty carefully. I first went to our city solicitor. He took into the conference with me another lawyer, who is a good man. Our mayor is very much interested in the subject. I took the matter to him. He is in close touch with a very prominent firm of lawyers here in Boston, and they have been consulted; and the result seems to be this: that there need be no conflict with the public statutes. Because the way they put it to me is this: that, broadly, boards of health may make such rules as they see fit, to govern their towns and the health of their towns, and to protect the inhabitants from disease, from whatever source it may come. The statute gives that broad power to boards of health. Now suppose we have a milk inspector. We have one in our city. This will not interfere with him in any way, because the city may make this ordinance. We get some of our milk from Vermont. We will control that in this way. While we cannot say any man shall have his premises inspected, provided he lives out of the State, we can say to him that he shall not sell his milk in our city until he has complied with the rules that we see fit to make or that our city makes, and passes into an ordinance. Now that will not interfere with the milk inspector. The milk inspector may give him a license if he chooses, but that will not interfere with our power to prevent him from selling milk until he allows us to inspect his premises.

In Pittsfield, I understand, they commenced this thing last year, and made a rule that all cows from which milk is sold in their city shall be examined by the tuberculin test; and they carried it out, and they did so under the statute. Now I wrote to the State Board of Cattle Commissioners, and asked them, as they have had considerable experience in the past two or three years, what their opinion was as to the advisability of my putting into our rules or into our

ordinance the clause demanding that all cows shall be examined by the tuberculin test. And there, again, we could not compel the Vermont farmer to have his cows examined; but, if he did not have them examined, we could prevent him from selling milk in our city. They made this reply: that it has been their experience that, the premises from which milk is sold being often in bad condition and the farmers not taking particular pains in replacing cows that have been condemned, it hardly seemed to them that a wholesale tuberculin test was necessary. But I was going to, and shall, put this into the ordinance: that all cows must be examined and pronounced free from disease,— and that covers the point Professor Sedgwick brings up,— that all cows must be examined and pronounced free from disease by a veterinarian appointed by the State Board of Cattle Commissioners. I thought, anyway, I would put that in, and let him pronounce on it. Then, if he says the cow is free from disease, it will be all right. If he says the cow is under suspicion, she will be immediately quarantined; and then the State will pay if such cows are condemned. But they said they thought that it would be sufficient if such cows as he finds, from a critical examination, have inoculated udders or other symptoms of tuberculosis, are thrown out. I have spoken with several veterinarians on this subject, and they all say that a physical examination is very, very uncertain; that it is difficult, even in some cases where the disease is considerably advanced, to tell whether it is tuberculosis or not.

Then, in regard to the premises, I was going to put this in our rules: that all premises, all dairies, all places from which milk is sold, shall be under the supervision of the board of health. Then that inspection shall be made at certain times. We can set this to suit ourselves; and we shall compel them to sweep down the cobwebs and clean up the barns,— some of them have never been cleaned,— and ventilate and light properly, and clean up the barn yards. We see so many barn yards that have never been cleaned, where the cows wade through manure to their udders; and we shall stop that.

Now I am going to do this; and I shall be very glad to let this body of men know, if they care to know, a year from now, how we come out,— whether we succeed in getting pure milk and cleaning up

the premises and vehicles and barns and utensils. And I do not think we shall have any trouble with the law part.

I would like to know whether any one else has had any experience and can say anything to help us. Our rules will go into operation very soon.

Dr. Peters.— Mr. President, as chairman of the Board of Cattle Commissioners, I have had a little correspondence with the gentleman from North Adams recently; and I have had a good deal of correspondence with members of other boards of health in various parts of the State,— in Fall River and Pittsfield and Waltham and various localities. They are all very anxious to have the cows tested with tuberculin. Now, when a cow is but slightly diseased, she will often react more, to a higher degree, than cows that are quite badly diseased. And it seems to me that at the present time, in order to protect the public health, it is sufficient if boards of health in various cities and towns will appoint, or if the selectmen shall appoint, or the mayor and aldermen,— if pains are taken to get competent ones,— inspectors of cattle, who shall make a careful physical examination, and report to us all the cattle that have inoculated udders or symptoms of tuberculosis, and put them in quarantine, sending duplicate orders of quarantine to us; and we will send some one to test them. But, if all these cities and towns are anxious to have a wholesale tuberculin test, and should insist on it, I think it would take $500,000 or $600,000 at least to do it. As our annual appropriation is only about $250,000, I do not see how we could possibly do the work. At the present time we are trying to do all we can with the means at hand, and to do as good work as we can. I think if these cattle that show physical evidence of disease or have inoculated udders are quarantined or killed, that is all we can do, for the reason that, if the owner of the premises does not thoroughly disinfect (and some premises cannot be disinfected unless you set them on fire and burn them down) or if he is not very careful in buying healthy cows, in six months from now there would be just as many cows that would react to the tuberculin test in this State as there are to-day. You might just as well throw money into the Atlantic Ocean as to buy cows very slightly diseased, and kill them and

destroy them, and do the work in that way. And, therefore, with the means at hand and the present condition of the farmers' premises, it seems to me that the only thing to do is to take the cows with diseased udders, those that are badly diseased; and there may be a day coming, somewhere near the time when the millennium approaches, when tuberculosis will be so rare among cattle that we can insist upon a compulsory tuberculin test of all the cows in the State. But we are not in a position to do it yet. What we want is to do the best work we can with what money we have. And, if we try to do more than that, we shall run into debt, and be discredited with the legislature, the public, and everybody else.

To show how little importance the farmers attach to disinfection, and how much importance has been attached to simply testing the cattle with tuberculin, I will say that this year we have put on a man to go around, and inspect all the stables where cattle have been taken that are diseased. And I was looking over his reports, and I got a few figures from them before I came down; and, very briefly, I will say that he examined 583 stables. And, at the time of his first visit to these stables, only 109 people had taken any pains to clean up and whitewash and disinfect in any way. On his second visit to these places, when he told them they had got to clean up their premises, 283 more had cleaned up the second time. On the third visit to the same places, about 18 more had cleaned up. So, of 583, only a little over 400 have disinfected their premises properly so far. Under the law we do not seem to have any power to make them disinfect their premises, so far as enforcing our request by any penalty goes; but we have a clause in the law that says, "Whoever by his wilful act or negligence contributes to the spread of tuberculosis shall not obtain any more compensation from the State for animals killed." And we have held that out over the farmers; and we tell a man, "While we have not any power to pull you into court, if you do not comply with our orders and regulations, yet unless you do clean up and disinfect, if you have any more cattle taken, we won't pay you a cent for any that are killed." And that seems to be a sort of bugbear that makes them clean up. And I think it has done a great deal of good.

Another point in connection with a healthful milk supply, I think,

is the water that the cows get. A great many of the reports of our inspectors show that the cows get well water; and the well is generally under the barn or in the barn yard, where the surface drainage runs into it. And it seems to me a very important matter that something should be done for the water supply of these farmers' barns. As it is now, in some instances the water that the cows drink actually has a terrible stench.

I think another very important thing, from the producers' and consumers' point of view, is to bring the producer and consumer as near together as we can. I think we have too many middlemen. The milk is produced by the farmer, who only gets two or three cents a quart for it, and is brought here to Boston by a middleman. The pedler buys it from the middleman, and perhaps a little green grocer buys it from the pedler. Now there has to be a little profit made by two or three people in bringing that milk from the producer to the consumer; and it seems to me a very important thing, and a thing that ought to be worked for, to bring the producer and consumer in as close contact as possible. Then the farmer will get a better price for his milk, and the consumer will get it purer and fresher. At the present time, when a farmer only gets two or three cents a quart for milk, it is a question whether he can afford to produce milk under the Utopian conditions asked for. He does not make much of any money now; and, if it costs him much more to produce the milk than it does at present, why he won't make anything.

Mr. Coffey.— I haven't any doubt at all of the authority of the boards of health to prescribe certain rules regulating the care and distribution of milk. But I do think that with the present statute in force, giving the authority to appoint inspectors of milk to the mayor and aldermen, there would be a conflict between the city council and the boards of health in a short time. And I am firmly of the opinion and firmly of the belief that this matter of handling milk and the licensing of pedlers and distributors of milk ought to be in the hands of the boards of health. I have held that opinion for seven or eight or nine years, since I was a milk inspector myself. And I think, if you go to the legislature and ask for an act enabling boards

of health to license milk pedlers and distributors, an act that is not too radical in its provisions, you will have the aid and assistance of the farmers. I have reason to believe that. If you leave it so that this tuberculin test can be exacted, and if the present law allows of the exaction of that examination, you will probably find that the farmers of the State will go to the legislature and have the law changed, so that you cannot have that power. Any one who is at all familiar with the legislation of the past two or three years, in relation to tuberculin and the power of the farmer, knows that they have gone to the legislature, and have so changed the laws there that tuberculin is no longer required; and they have materially altered the law in relation to it in the past two or three years. And I think, if they find out that boards of health have now authority to exact that test, they will seek to get legislation that will prevent it. I know, or at least I have reason to believe, that the farmers are willing to co-operate with this organization in the obtainment of an act that will put the care and licensing of milk pedlers in the hands of boards of health; but I think they would ask that the tuberculin test be not included in that act. If something to the effect that an examination by a competent veterinarian should be required was put in there, I think they would be perfectly satisfied with it. We know how powerful they are in obtaining legislation, and I think they would exert all their power to prevent it if you asked for or had an act that would allow of the use of tuberculin and making that a necessary test.

Dr. Burr.— I do not think that the committee considered tuberculin in any way. I am sure that hardly a word was said of it in any of our meetings. It never was intended that the examination of the cows on farms in this State or other States should be made with the tuberculin test.

Mr. Coffey.— If you will pardon me, that section I had read empowers the board of health to require that. It says a test satisfactory to the board. Now, if the board deemed the tuberculin test desirable, it can exact it.

Dr. Burr.— If the section referred to was so worded that it would be possible for a board of health to call for the tuberculin test, I

must say I am not in favor of it. I cannot speak for the rest of the committee; but I am very sure the committee did not consider tuberculin in any way, and did not mean that tuberculin should be used or required.

Now, with regard to the examination made by qualified veterinarians, it seems to me we can hardly exact that at the present time, because the Board of Cattle Commissioners in this State do not call for it. If we go into an examination of the cattle through inspectors appointed by the mayor and board of health and confirmed by the Board of Cattle Commissioners, we are not going to get qualified veterinarians: we are going to get anything from a cobbler up. It seems to me it is going to be pretty hard work to call in a qualified veterinarian. Many of the towns and cities have no qualified veterinarian within twenty miles. I want to emphasize the fact that the committee did not call for, and did not intend to call for, the tuberculin test in any way.

Dr. Miller.— In order to expedite business, I would suggest that the gentleman read the articles, beginning with the first one, and we discuss them and adopt them as we go along; and then whatever is left unfinished we can discuss at some other meeting. By the present method we are scattering over a good deal and finishing nothing. It strikes me it would be better to have the first article read; and then we can approve of it, or dispose of it in some way, and go along in that way, and finish up as far as we go.

Dr. Miller's motion was then put by the President, and unanimously carried. In accordance with the motion Professor Sedgwick read the first section of the first article.

Professor Sedgwick.— I will say in regard to that, "persons engaged in the production of milk for sale," it was not intended to make it necessary for the man who keeps a cow for his own use and produces milk, not for sale, or who gives it away to his neighbor, or anything of that kind, to come under this,— simply men who enter the market of public milk supply.

Dr. Russell.— I am glad the gentleman put that word in,— "public" milk supply. That leaves out most of the sources of

trouble we have. The milkman who makes a business of selling milk, for instance, in my own town, does now keep his barns in reasonable shape. I have licensed between fifty and sixty men this last year, but only ten or twelve of them are milkmen; and other men all about town have cows,— one, two, or three, or even half a dozen,— and sell milk, at least fifty of them. And those are the men who make trouble. I do not see how it is fair to say that the man who carries milk around in his cart for ten families shall have a license, while the man who does not have a cart shall not have.

PROFESSOR SEDGWICK.— I beg pardon. "All persons engaged in the production of milk for sale." That would include every one.

DR. RUSSELL.— Go on, and read the rest.

PROFESSOR SEDGWICK.— "Or in the sale, delivery, or distribution of milk in the city or town."

DR. RUSSELL.— You also added to that the word "public."

PROFESSOR SEDGWICK.— That was not in here. I think the doctor misunderstood me, or at least I did not make myself clear. What I meant to say was, it was not intended to make it necessary for the man who keeps one cow for his own use, or who keeps a cow and gives milk to his next-door neighbor, to take out a license. But the moment he begins to sell milk, even if he sells only a quart, then he is included.

DR. RUSSELL.— I am glad you make that explanation. In my own town we have the trouble from these people who sell to one or two persons, and many of those people sell to eight or ten. Then the men who are recognized as milk dealers, who go out with the carts, go to the inspector of milk,— and, by the way, please remember the inspector of milk is not an inspector of cattle: they are two distinct officers,— they go to the milk inspector, and say, "This man is selling milk." The inspector goes to that man, and says, "You are selling milk." He says, "Well, I only sell to two." The answer is, "There is no difference between selling to two and ten." The man gets angry, and says he is not going to take out a license for selling to two people; and we have a great deal of trouble with him. Another man goes, and says his neighbor across the way gives the milk away; and so the poor milk inspector is in hot water all the time.

THE PRESIDENT.— What is your pleasure in regard to this section?

DR. MILLER.— I move it be accepted and adopted.

Dr. Miller's motion was put by President Walcott, and unanimously carried; and the section was declared adopted.

Professor Sedgwick then read Section 2 of Article I.

MR. COFFEY.— Now, Mr. Chairman, that goes back to the original point I made. Is it clear that boards of health have the right to license milk pedlers, when that right is distinctly conferred upon an inspector of milk appointed by the mayor and confirmed by the board of aldermen? Now, supposing that we had that right, and that the milk inspectors did not license until after the board of health had licensed, both acting in concert, and that the board of health for some reason or other revoked that license, as this section gives them the right to do, and that the milk inspector refused to revoke. Then where are you?

THE PRESIDENT. — I do not know; but I have assumed that the object of these regulations was simply to obtain an ideal set of rules, and that this Association would subsequently ask an appropriate committee to obtain legal advice as to the limitation of the powers possessed, and, if any additional power was needed, to secure it by an application to the legislature for legislation. I should think that would be absolutely essential, whatever we do.

DR. MILLER.— Mr. Chairman, I move this also be adopted.

The motion was unanimously carried, and Section 2 was declared adopted.

Professor Sedgwick then read Section 3. Mr. Coffey moved that it be adopted. The motion was unanimously carried, and the section declared adopted.

Professor Sedgwick then read Section 4, and Dr. Miller moved that it be adopted.

PROFESSOR SEDGWICK.— Dr. Smith makes a valuable point, which I will ask him to state himself.

DR. SMITH.— I simply wish to say that the statement "free from disease" is rather broad, because a cow may be suffering from some

local disease which does not affect the milk supply. I should say "any disease dangerous to human health."

PROFESSOR SEDGWICK.— I will see if I can work that in,— "and shown to the satisfaction of the local board of health to be free from any disease dangerous to man."

DR. SMITH.— There is some objection to that, because a cow may be affected with incipient tuberculosis which is not in that stage dangerous, because the cow does not shed tubercles in that stage. It is only in the later stages that it is dangerous. It is only a question whether "free from disease dangerous to the public health" would not include all cows that are slightly affected, but not under those circumstances dangerous to human health.

THE PRESIDENT.— Why not say "not now dangerous"?

DR. SMITH.— It may be a full year, according to that statement; and during that time she may have died of tuberculosis.

MR. PARKER.— There is a very interesting point that bears on this subject. Of those animals quarantined by the local inspectors on physical examination, and tested and condemned by the board, the cases of generalized tuberculosis which might be considered the dangerous cases have been enormously reduced upon physical examination, so that, from somewhere about 32 per cent. in 1895 and 25 per cent. in 1896, it had been reduced somewhere to — I won't say exactly, but in the neighborhood of between 2 and 3 per cent. this present year. It seems to me that is a very important point.

MR. COOK.— It seems to me this annual inspection of cattle is already provided for under the statute. The local inspector, under the statute, by order of the Cattle Commissioners has to make an annual inspection. And in relation to any conflict between local inspectors and the local board of health, so far as our experience has gone, it has been entirely free from any friction whatever. Early in the year our board determined upon a thorough inspection of every cow stable in the city of New Bedford. They had some sixty applications for licenses to keep cows. And, before issuing those licenses, the entire board, together with their local inspector, who is appointed by the mayor and aldermen also,— for he is a cattle inspector and milk inspector,— went to every stable throughout the city, and examined it, and the cows were also examined; and the inspector and

the board were in perfect unison in the matter, and had no difficulty whatever. The result was the New Bedford Board of Health drove ten cow stables out of existence. Whether they had authority or not, they did it. And there are ten less cow stables in New Bedford to-day than there were early in the year. They finally did that, and they assumed that they did have control of the milk; and, if it came from localities that were not what they should be in the opinion of the board, the board would not hesitate to prevent the sale of that milk, and, if those who felt aggrieved by it wished to carry it further and test it, it was their privilege to do so. The board felt they were able to cope with it. The result was, all the cow stables in New Bedford that were not properly ventilated or were not large enough were made to be enlarged, and new windows put in; and they were made to put in fresh sawdust, and to keep the stables in suitable condition at all times. And our inspector goes around very frequently, and visits all these stables now, and sees that they are kept in that condition. And we have so far this year had no trouble whatever. And the condition of the cow stables in New Bedford to-day is vastly superior to what it was six months ago, and I cannot see why the matter is not entirely within the scope of the authority of the board of health. At least, we have tried it; and we intend to go still farther with it.

Professor Sedgwick.— Dr. Smith has made a suggestion that may meet the difficulty or may not. He proposes that it shall read something like this: "No milk shall be sold, offered for sale, or distributed in any city or town unless the cows from which it is derived are considered by the board of health, for practical purposes, free from diseases dangerous to the public health." That leaves out the part about examination by competent authority. But it was assumed that the board would have to get some examination from some source to show that they were free from diseases dangerous to the public health. I do not know whether this will meet with approval or not.

The President.— The section as originally presented to this Association was this: "No milk shall be sold, offered for sale, or distributed in any city or town unless the cows from which it is derived, have within one year been examined by a competent authority, and shown to the satisfaction of the local board of health to be free from

disease." It is proposed to amend this, so that it shall read, "No milk shall be sold, etc., unless the cows are considered by the board of health, for practical purposes, free from diseases dangerous to the public health."

MR. COFFEY.— I would like to amend that still further, Mr. Chairman, by adding, "provided, however, that the tuberculin test shall not be exacted except with the consent of the owner of the cattle."

DR. PETERS.— I think, in the general law covering the work of the Cattle Commission, that is provided for. In the law it says that tuberculin shall not be used for diagnostication without the consent of the owner, unless the animal is first said to be diseased by a competent veterinarian. So I think the owner is already protected.

THE PRESIDENT.— The question is, first, in regard to the amendment introduced by Mr. Coffey. Is it your pleasure that the amendment should be adopted?

MR. COFFEY.— If you will permit me to say a word? The gentleman from North Adams said they exacted that test in Pittsfield, and he proposed to exact it; and I have rather the feeling, if the doctor says he will do it, he will do it.

DR. SIMPSON.— I wrote to the Board of Cattle Commissioners,— I did not know Dr. Peters was here until a moment ago,— and asked them whether that was advisable. They wrote to me, and said they did not consider it necessary. Now, as they do not consider it necessary, I shall of course drop that. And I do not think there is any board of health that could exact it, or would exact it contrary to the wishes of the State Board of Cattle Commissioners. I should have exacted it if they had considered it necessary; but, as they did not, that will be dropped out.

MR. COFFEY.— I withdraw the amendment, Mr. Chairman.

THE PRESIDENT.— The question is, then, with regard to what the committee chose to submit.

PROFESSOR SEDGWICK.— I should prefer, rather than to have this carried through hastily, that it be referred back to the committee for further investigation.

THE PRESIDENT.— It is moved that Section 4 be referred back to the committee for further consideration. Is that your pleasure?

The motion prevailed, and Section 4 was referred back to the committee.

Professor Sedgwick then read Section 5.

MR. PILSBURY.— I move that all these sections, unless objection is made, be considered adopted.

Mr. Pilsbury's motion was seconded, and unanimously carried.

Professor Sedgwick then read Section 1 of Article II.

THE PRESIDENT.— Is there any objection to this section? If not, you will signify its acceptance by saying aye.

The section was adopted by a unanimous vote.

Professor Sedgwick then read Section 2 of Article II.

MR. ELLIS.— I would suggest a slight change, that instead of "the room" a different provision shall be made. This makes it obligatory that this sterilizing be done in a certain room, and I suggest that provision should be made that it should not necessarily be in that room.

PROFESSOR SEDGWICK.— The committee thought it ought to be done in this particular room. I should like to ask why not.

MR. ELLIS.— In my own case, my milk-room and my provision for sterilizing bottles, etc., are independent one of another. Why should I be obliged to do it in the same room? If I have provision for that, is not that sufficient?

PROFESSOR SEDGWICK.—"Or in some room satisfactory to the board of health" I should suppose that would be all that was required. I think, if there is any debate, that had better not be accepted, but referred back.

On motion of Mr. Coffey, Section 2 was referred back to the committee.

Professor Sedgwick then read Section 3 of Article II.; and it was adopted, there being no objection.

Section 4 was then read by Professor Sedgwick.

PROFESSOR SEDGWICK.— The idea is that the milk should be taken after milking right away from the stable or cow yard, and handled, cooled, and stored in the regular milk-room, as it is in many cases now.

MR. COFFEY.— I think that ought to go back also with the other one, because my idea of the first one was the impracticability of the adoption of this for the small dealer.

THE PRESIDENT.— If there is any objection, I think it will be referred back without question.

MR. COFFEY.— A large number of milk producers have only a few cans.

THE PRESIDENT.— This section will be referred back to the committee.

Professor Sedgwick then read Section 1 of Article III.

THE PRESIDENT.— Is there any objection to this?

On motion of Dr. Durgin the section was adopted.

PROFESSOR SEDGWICK.— It was suggested that this section should contain the word "ice,"— that the refrigerator might be used without ice. That may be introduced if there is no objection.

Professor Sedgwick then read Article IV.

THE PRESIDENT.— Is there any objection to this article?

There being no objection, the article was adopted by a unanimous vote.

PROFESSOR SEDGWICK.— There only remain the two articles on contagious diseases, which I hardly think there can be any objection to; but I will read them. [Reads first section.]

THE PRESIDENT.— What is your pleasure in regard to this section?

On motion of Dr. Farnham the section was adopted by a unanimous vote.

Professor Sedgwick then read the second section.

Mr. Cook.— I would like to ask if the boards of health throughout the State are not already carrying out that same idea?

The President.— I hope so.

Mr. Cook.— It seems to me that is already being carried out by the local boards. I am sure it is in New Bedford.

Mr. Ellis.— Its adoption, then, can do no harm.

Mr. Cook.— It surely can do no harm, but I am surprised that it should be deemed necessary to suggest it.

The section was then unanimously adopted.

The President.— Will you authorize your committee to obtain proper advice, if necessary, upon the legality of the rules that they have proposed?

It was unanimously voted that the committee be authorized to get proper legal advice upon the constitutionality and propriety of the rules.

The President.— Is there any other business? If not, we still have a few minutes of time. The Association has present certain gentlemen who are interested in the production of milk, and I wish we might hear from them. Mr. Ellis, haven't you anything to say upon this subject?

Mr. Ellis.— I doubt, Mr. Chairman and gentlemen, if I could say anything that would be of service. The question, as it touches me, is somewhat different from that touching most producers and sellers of milk. I am in direct communication with my own consumers. And about the only thing I would say is that I think the general public appreciate, and will appreciate, the efforts of boards of health, of producers, and of dealers in milk, to furnish a pure article, to an extent that they have not been fully credited with. My own experience has indicated that people in general are willing to pay a higher price for milk that they are reasonably sure is pure and is well cared for. I happen to be so situated that I am within easy access of nearly all the consumers to whom we supply milk,— some fifteen hundred quarts a day; and we have

adopted, as far as possible,— with the exception of Pasteurization, which I believe Professor Sedgwick considers not only important, but essential,— most of the new ways of handling milk. In our case the milk is drawn from the cow, and almost immediately cooled to a temperature of between 38 and 40 degrees, and bottled. My own theory — not being a scientist — is that such milk is better — at any rate, I would rather have it — than Pasteurized milk, if properly taken care of after it leaves my place. And that milk is in the hands of consumers within three hours. I cannot well contribute — in a moment, at any rate — to this discussion with anything valuable, because, as I say, my own experience is different, necessarily, from that of most producers.

Dr. Durgin.— I would like to ask Mr. Ellis whether or not it is possible or practicable to have the cow so cleaned before each milking as to avoid a large amount of this filth which is continually dropping into the pail during the process of milking.

Mr. Ellis.— As to that, I will only say that last Sunday a lady came to me at church, saying that the day before she had visited our farm, and had been greatly pleased to find in our strainer cloth, through which the milk from one hundred and twenty cows had been strained, less filth than she had seen, in her old days on the farm, after one cow's milking.

Dr. Durgin.— How do you obtain that, Mr. Ellis?

Mr. Ellis.— By care of the cows, sir.

Dr. Durgin.— Well, particularly?

Mr. Ellis.— In my case the cows are groomed every day. Most of my cows — seventy-six of my cows — are kept in pens, 7 feet by 9, never tied. They have before them water all the time. They are carefully cleaned. The pens are carefully cleaned every day; the manure carried off the farm. They are bedded with sand. There are no floors in these pens. The bedding is sand and planing-mill shavings. Our building is a one-story building with a dome roof; and I would not undertake to say how many square feet or cubic feet of space our cows have, or how many windows there are, but they are plentiful.

Dr. Durgin.— Would you regard it as unreasonable, Mr. Ellis, if the committee or this Association required in each instance that the

cow should be so cleaned before milking as to avoid this large amount of filth dropping into the milk?

Mr. Ellis.— I think we have got to come to that. We have got to work toward it. I do not know that you could at once adopt rules that would compel all farmers to do that.

Dr. Durgin.— To my mind, it becomes a very important part of our work; for, do as much as we will, there is more or less dropping of dust and filth from the cow into the pail which contains the milk. There ought to be such grooming or cleaning of the cow's teats before the milking as will avoid very much of this filth getting into the milk. It seems to me also that, in the pasturage of the cows, we ought to so regulate that cows shall not be allowed to wade in filth, which soils the teats and becomes a serious means of polluting the milk.

Mr. Ellis.— My own theory would be that that would be impracticable, particularly in hot weather. Cows too much enjoy getting into the water and in the edges of rivers, and so forth.

Dr. Durgin.— I think we shall try it in Boston.

Mr. Ellis.— I think it would be impracticable.

Dr. Burr.— Mr. Chairman, I would like to say just one thing, in addition, that this committee did not touch on or did not report on it. It was well considered, but we hardly knew how to report upon it; and that is, in regard to milk transportation. Milk is transported now from the farms by the railroads and contractors. We have made no rules and regulations governing the contractor or the railroad. We have believed that at times our milk is very old on arriving at the railroad station in the city or town where it is consumed, and it seems to me that something ought to be done in regard to that. As you all know, in the city of Boston the milk arrives at a late hour in the morning, about eleven o'clock; and that milk may be this morning's, in some instances last night's or yesterday morning's, possibly. And I think, in a good many instances, that of the day before. On arriving at Boston, at ten o'clock, it is taken by the milk dealer to his place of business, and there cared for during the day, and delivered the following morning, which makes it at least thirty-six hours old. I think that must be pretty near the minimum. It seems to me that it would be a good plan to limit the age at which

milk should be received in Boston or in any city. Supposing we limit it to twenty-four hours. It would then be at least twelve hours older before it reached the consumer. If milk should arrive in Boston or any large city in the evening from ten to twelve o'clock, it might be this evening's or this morning's milk, and then be delivered immediately by the dealer the following morning,— in that case not to be over twenty-four to thirty hours before it was received by the consumer. I know, from a few questions that were sent out from the Boston Board of Health, that in almost all instances it does not take over four hours to get the milk into Boston. If that is the case, if it does not take over four hours to get the milk into Boston, it seems to me we can get this morning's and last night's milk delivered in Boston to-day. If it arrives in Boston at night, we might have this evening's and this morning's milk delivered the following morning. It seems to me that question ought to be considered by this Association. I will say that the committee hardly knew how to fix it.

A MEMBER.— I would like to say that, if all milk farms were in the condition of those managed by Mr. Ellis, there would be no occasion for any rules either by this Association or by the legislature.

MR. ELLIS.— Mr. Chairman, I will extend an invitation to this Association to hold its next meeting at Wauwinet Farm. It is very easy of access on the Commonwealth Avenue line of the electric road. I should be glad to extend that invitation.

THE PRESIDENT.— I hope I may call to Mr. Ellis's attention the fact that this Association will have to hold its next meeting in Boston; but will this invitation hold good for the meeting after the next?

MR. ELLIS.— Certainly. Yes, sir.

DR. OSGOOD.— One thing I would like to say. In order to bring about any great results in the line of the purity of the milk supply, one thing we ought to consider; and that is, the price the farmer is getting for his milk. The average farmer to-day is getting about three cents a quart for his milk. Now we are requiring him to conform to a great many rules and regulations, increasing the expense of the production of that milk. In my past experience with the farming community, I found that a large part of them thought that

by having their herds subjected to a test, assuring their customers that they are furnishing a pure milk supply, there would be a disposition on the part of the consumer to give a little more for that quality of milk. Now I think this Association can do a good work in encouraging their clients to be willing to give a living price for a pure article. I think that is a fundamental step; and I think it is the duty of every physician and of every one connected with this Association to encourage the people, first educating them to the idea that we need a better article than the farmer can furnish at the price he is getting to-day, and then encouraging them to be willing to pay a living price for that product.

Mr. Ellis.— May I add one word? This last summer, when Mr. Whiting,— who is, I suppose, one of our largest milk contractors,— was visiting at my farm, he dropped the remark that, if the contractors could buy from the farmer milk properly taken care of, they, the contractors, could well afford to pay a higher price for that milk, if they sold it at no higher price. I presume Mr. Hood will bear me out?

Mr. Hood.— Yes, I think so.

Mr. Ellis.— If the milk coming from the producer were of such quality and of such character that the contractor would lose less, he could easily pay a higher price for his milk. Mr. Hood, I think, agrees with me.

The President.— Mr. Hood, haven't you something to say on this matter? We should be very glad to hear from you.

Mr. Hood.— Mr. Chairman and gentlemen, I do not think I ought to take your time, though I am very much pleased to be here, and say a word. I have been much interested in what has been said; and it is very interesting to us, as dealers, to hear such a discussion, which should be interesting to every consumer and producer. The producers, first, have got to be educated,— no, not first. We should be educated first. Then we can help to educate the producers. Most of our producers are willing to do what they can to furnish the best article for the market. And, if we ask them to do anything that they can see for themselves will improve the milk, they will do what we ask. But, if we tell them that the milk tastes of clover, which fact they cannot themselves detect, and ask

them to take their cows up at two or three o'clock in the afternoon, they are not willing to do that; and they may say to us: "We ought to know something about it. We sold milk before you were born." Yet we think the producers, as a whole, are always willing to do their part in helping us to get the best. Many of our farmers feed turnips, and we find that they can be fed without harm immediately after milking; but, if fed before milking, they affect the milk.

MR. ELLIS.— The same is true of ensilage.

MR. HOOD.— Yes, the same is true of ensilage. Now, to come to the question of the transportation of milk, we are all anxious to get the milk off the farm as quickly as possible, because we lose money by holding it. Large milk contractors have chemists; and the next thing for them to do is to have bacteriologists, and I think that is a move that will be made very soon.

After transportation, we come to the milk dealer, but just a word in regard to the middlemen. In New York there are no middlemen; and every farmer is a shipper, and is therefore a competitor with his neighbor. When he loses a customer, he goes to New York, and tries to place his milk. Then the other farmer, who has lost the customer, goes there also to place his milk again, and, as a rule, has to place it at a still less price. Then the next farmer goes, and, finally, all the farmers. The result is, the price paid for milk within one hundred miles of Boston is 20 per cent. higher than in New York, where there are no contractors, and has been for the last few years. The contractors keep up the price in the country, and they are the ones that can help bring about the improvements which you recommend. They are the ones who must provide chemists, who must help the boards of health in the country towns and in the cities, who must provide men to test for bacteria, and who must do all they can to educate the farmers.

Now we come to the milk dealers here in Boston. They judge milk almost entirely by the sense of taste; and some, of course, become so expert in tasting milk that they can detect the difference between milk flavored with turnips or ensilage or cabbages, can distinguish the taste coming from a dirty stopper, wormword in the pasture, or clover, when fed in excess. They will detect the bad effect caused by mixing warm and cold milk, and a good many other

things, which perhaps, cannot be detected by any other means. The milk is taken by the dealers to their stables; and, of course, in some instances, it is handled in a very poor way. Yet many dealers take pride in the neatness of their milk-rooms.

About the price of milk in the city. The milk dealers are selling a great deal of milk delivered up several flights of stairs, in pint cans, for three cents a pint, the year round. They cannot afford this, and pay the prices they do for the milk. But they are compelled to do so, because there are stores in town that are selling milk for four cents per quart, and perhaps less. And they say, "We must hold our business." They do it by using cans badly jammed, cans that are not fit to use, washing them, but not sterilizing them, and furnishing the cheapest stoppers. They must deliver milk at an early hour, between one o'clock and six. They cannot deliver it in the daytime because their customers might wish to speak with them, and they have no time for that. To improve the milk supply, we should do something to stop the sale of cheap milk. No one should be licensed unless he will sell at a fair living profit. But we find it is said to the storekeeper: "Sell your milk cheap, because you will sell a lot of it. Don't try to make any money on it, but sell it as a leader." If he drops a cent on beef, nobody will know it; but, if he drops a cent on milk, everybody will know it. These stores can cut the price on milk, and make money on something else; while the milk dealer has only one article to sell; and, furthermore, he is poor. That is, he is running along, and doing the business in the cheapest way possible. Some storekeepers have no suitable ice-chest in their store, and handle the milk in the most careless way, and perhaps do not thoroughly wash the measures used for the milk from one week's end to another.

As to who shall wash the cans. Perhaps they should be washed twice, once in the city as near the consumer as possible, and once in the country by the producer; but the consumer or the person who empties the can in the hotel dining-room or store should immediately wash the can. That is just the time and place to have them washed; for it could then be done most easily, and it would remove all the milk on which the bacteria so thrive. Let them be washed and sterilized again at the farm, for that will be found quite necessary.

I will say, in sterilizing the cans, I think it is quite important that the can should be sterilized and stopped up dry; that is, the water, the draining water, should be out before the cans are stopped up.

To go back to the farm again, I should think that the interior of barns should be whitewashed twice each year. The lime costs practically nothing, and the producer has plenty of time in the fall and spring to whitewash the barn; and those who have it done are very well pleased, and take pride in the changed appearance. The stables should get plenty of sunlight, and the cows should be on the sunny side as much as possible.

I am very glad to have had the opportunity to be with you, gentlemen, and to enter into this discussion.

THE PRESIDENT.— Dr. Durgin inexorably moves that we now adjourn, because our places are needed by others. If that be your pleasure, you will manifest it by saying aye.

The motion was unanimously carried, and the meeting was adjourned.

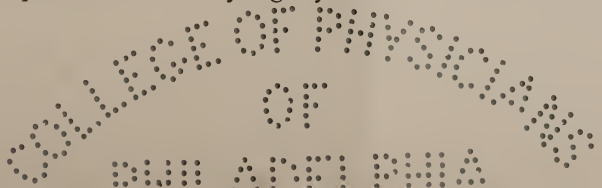
PUBLISHERS' DEPARTMENT AND BOOK NOTES.

In this department the publishers will include notices of such subjects, germane to the scope of the *Journal*, which would seem to be of interest to its readers, but which are not a part of the transactions of the Association.

A SANITARY MILK-PAIL.

In view of the fact that throughout the current discussion on the subject of milk such great emphasis has been laid on the importance of taking every precaution to keep impurities out of the milk from the very moment it leaves the cow, it is believed that readers of the *Journal* will be interested to learn of a device which has recently been perfected, designed to begin at the very beginning, and prevent the least defilement reaching the pail from the hands of the milker or the udder of the cow. It is well known that a great cause of impurity in milk comes from the droppings from the body of the animal into the open milk-pail, and the difficulty of purifying such milk by any subsequent scheme of filtration is practically insurmountable. Of course, where cows are thoroughly groomed, this source of pollution is reduced to a minimum; but very few milk producers have as yet cared to go to this extra expense and trouble. Even when cows have been groomed, there is still the chance of hairs dropping into the milk, or of impure matter from other sources falling into the pail during or after milking. With this in mind the Climax Milk-pail has been devised. It consists of a tin pail of the usual size, closed by a tight-fitting cover, with two good-sized openings, which are protected by funnels raised considerably above the surface of the cover, and the bottom of these funnels covered with a close-mesh wire strainer. All milk entering the pail must first pass through these strainers; and, the mouth of the funnels coming close up to the udder of the cow, all other portions of the animal's body are effectively shut off from the milk, and, while the udders are usually the cleanest parts of the cow's body, yet, even if dirt should fall thence into the funnel, it could be picked out before being dissolved through the strainer. If not an absolute guard against any slight particles of dirt reaching the pail, it is apparent that the use of such a pail would greatly diminish such chances, as against the use of an open pail.

An additional improvement in the construction of the Climax Milk-pail consists in knee rests in the shape of hooks made by strips of metal, which, when in use, hold the pail securely in place, thereby relieving the milker of the strain caused by the necessity of cramping an ordinary pail between his legs. As the price of this milk-pail at the present time is only slightly above the cost of the old-fashioned



open pail, it would seem quite likely that, if it were generally adopted by farmers and dairymen, it might be possible for the manufacturers to bring the price nearer still to the cost of an open pail. In its present shape it is well worthy of serious investigation and careful trial. It has already been indorsed by many of the leading farmers and dairy-men as superior to anything in the market.

BOOK NOTES.

Dr. Samuel W. Kelley, the well-known authority on Pediatrics, has just published, under the title *About Children* (The Medical Gazette Publishing Company, Cleveland), six lectures originally delivered before the nurses of the training school of the Cleveland General Hospital. While this book makes no pretence of being a complete treatise on its subject, it is full of valuable information, very helpful not only to professional nurses and medical students, but in the home as well. The author has endeavored to give an insight into the nature of the child which will better enable the nurse to study the little patient. The topics considered embrace infant anatomy; growth and development; physiology; pathological conditions, deformities, diseases, injuries; symptoms and their interpretations; nursing and general management of sick children; and the closing chapter includes an excellent dissertation on artificial feeding, pasteurized, sterilized, and modified milks. A good index permits ready reference to every subject; and, while the treatment is scientific, it is readily intelligible, and admirably adapted to impart sufficient medical knowledge to enable the nurse to act more intelligently under the physician's instruction.

Messrs. R. L. Polk & Co. are preparing the fifth edition of their *Medical and Surgical Register*, which was first issued in 1886 and has been regularly published since that time. This monumental work, which is the first and only attempt ever made to record the medical profession in the United States according to the medical college training of each individual, won favor from the start, and is generally acknowledged to be the most reliable list of physicians, medical institutions, societies, etc.

The general Index of Physicians enables one to find a friend practising anywhere in the United States or Canada, and in many ways it constitutes an invaluable work of reference for every physician's library.

The publishers announce that no expense will be spared to make it the most complete and accurate yet published, and are adding a list of physicians and medical institutions in Canada as a valuable feature of the 1898 edition.

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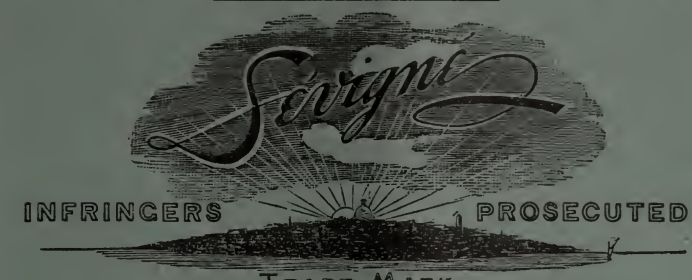

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OF THE

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OF

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Have you ever seen the methods employed by the ordinary baker? If so, are they not suggestive of anything but healthy conditions? Give this matter your immediate attention. Place a loaf of bread (ordinary) under a glass: **ONE LOOK** will suffice.

We have made a careful study of the art of bread-making, therefore **MUST EXCEL** in our specialty. We are represented in nearly all the larger cities of New England, and are appointing new agencies every day in other States. You will confer a great favor by advising us of any town or city that is not being supplied with our goods.

A trial of the goods is sufficient to convince any intelligent person that they are what we claim them to be. The price is no advance over any other, and the goods are to be found at all well-appointed grocers'.

We are the originators of a wax wrapper, as applied to bread, and own and control the above **TRADE-MARK.**

Why Physicians should insist upon the use of SÉVIGNÉ BREAD in every Hospital and in every Household.

1st. **Because** it is made under the most healthy conditions.

2d. **Because** it is protected from all uncleanliness from the oven to the table by a specially prepared paraffine wrapper, and has no chance to become contaminated, as is the case with ordinary bread.

3d. **Because** the material is the **best** obtainable.

4th **Because** it bears our **Trade-mark,** which is a guarantee that it is the **best** that money and skilled labor can produce.

"I have proven, by the microscope and other tests, in comparison with other breads, its compactness and freeness from all impurities, and heartily recommend it to all hospitals and public institutions."

(Signed) W. O. DUNHAM, M.D.,
Cottage City, Mass.

"The advantages of this wrapper are readily appreciated, and I predict that in a comparatively short time the Sévigné Bread Company will be the most extensively known concern of its kind in the United States."

(Signed) W. S. JERNEGAN, M.D.,
Boston, Mass.

THE SÉVIGNÉ BREAD CO.,

Office, Smith Building. 15 Court Square, Boston, Mass.